UNITED STATES OF AMERICA:
WAR DEPARTMENT.

MONTHLY WEATHER REVIEW.

(GENERAL WEATHER SERVICE OF THE UNITED STATES.)

FEBRUARY, 1886.

PREPARED UNDER THE DIRECTION OF
BRIG. & BVT. MAJ. GEN'L W. B. HAZEN,
CHIEF SIGNAL OFFICER OF THE ARMY,

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List of merchant marine steam and sailing vessels from which International Simultaneous Meteorological reports were received at the Office of the Chief Signal Officer, U. S. Army, Washington, D. C., in time to be used in the preparation of the Weather Review for the month of February, 1886.

Name of vessel.	Captain.
Allan Line.	
Br. s. s. Grecian	Capt. C. E. LeGallais.
Norwegian	E. Carruthers.
Prussian	Alex. McDougal.
Sarmatian	Wm. Richardson.
Scandinavian	John Park.
Siberian	R. P. Moore.
American Line.	
Br. s. s. British Princess	E. H. Freeth
Lord Clive	P. Vaughan.
Ocean Prince	W. J. Milburn.
Anchor Line.	
Br. s. s. Acadia	John McKeague.
Alexandria	Robert Port.
Australia	Alex. McRitchie.
Cleopatra	A. Campbell.
Columbia	R. Th. Garside.
Devonia	Hugh Young.
Dorian	Isaac Swain.
Ethiopia	John Wilson.
Olympia	James Brown.
Trimountain	Geo. Mitchell.
Anglo-Australian Steamship Company.	
Br. s. s. Port Phillip	Geo. Dutling.
Arrow Line.	
Br. s. s. Crystal	R. B. Stannard.
Atlas Line.	
Br. s. s. Atlas	J. W. Sansom.
Albano	H. R. Hughes.
Span. Alps	T. Anasagasti.
Br. Alva	David Williams.
Span. Andes	D. de Amezaga.
Antillas	B. Morin.
Br. Claribel	T. M. McKnight.
Booth's S. S. Co. (limited).	
Br. s. s. Clement	Thomas Burley.
Bordeaux Steam Navigation Company.	
Fr. s. s. Clotean Lafite	C. Journeil.
Bristol City Line.	
Br. s. s. Brooklyn City	W. Fitt.
Jersey City	E. Horlor.
Liverpool City	T. H. Goss.
Wells City	T. L. Weiss.
Canada Shipping Co.	
Br. s. s. Lake Winnipeg	H. Campbell.
Lake Superior	Wm. Stewart.
Cromwell Line.	
Am. s. s. Louisiana	E. N. Gager.
Hudson	H. R. Freeman.
Cunard Line.	
Br. s. s. Auranta	W. H. P. Hains.
Catalonia	Alex. McKay.
Gallia	M. Murphy.
Pavonia	R. Woodlendon.
Servia	H. McKay.
Edward Carr's S. S. Line.	
Ger. s. s. Australia	G. Franck.
California	C. Winkler.
Europa	L. A. Kessal.
Polynesia	A. Kahn.
Fabre Line.	
Fr. s. s. Alésia	—— Vallat.
Nemesis	P. Verriers.
Furness Line.	
Br. s. s. Boston City	W. T. Shoeborne.
Durham City	M. P. Lund.
Stockholm City	K. Doyle.
General Trans-Atlantic Steamship Co.	
Fr. s. s. Amérique	E. Santelli.
Canada	G. de Kerambloc.
St. Germain	E. Traub.
Labrador	P. d'Hauterive.
Normandie	E. Frangeul.
St. Laurent	M. de Jonsselin.
Grand Western S. S. Line.	
Br. s. s. Dorset	Ch. Off. Wm. H. Bates.
Guion Line.	
Br. s. s. Abyssinia	Capt. J. Price, R. N. R.
Alaska	Geo. S. Murray.
Arizona	J. Price, R. N. R.
Nevada	John Douglas.
Wisconsin	Edward Rentley.
Wyoming	C. L. Rigby.
Hamburg-American Line.	
Ger. s. s. Bohemia	R. Karlowa.
Gellert	W. Kühlewein.
Lessing	B. Voss.
Moravia	C. Petzoldt.
Rhætia	H. Vogelgesang.
Rugia	A. Albers.
Suevia	C. Ludwig.
Inman Line.	
Br. s. s. City of Berlin	Francis S. Land.
City of Chicago	Fred Watkins.
City of Richmond	A. W. Lewis.
Johnson Line.	
Br. s. s. Nessmore	John Inch.
Lamport & Holt's Steamship Company.	
Br. s. s. Bessel	Chas. J. Watson.
Bolis	Fred Graham.
Dalton	J. Russell.
Euclid	Alex. W. Pym.
Halley	W. P. Ballentine.
Hamlet	John Carroll.
Helios	Wm. Kelly.
Belg. s. s. Hipparchus	E. Johnson.
Keppler	Robt. Graham.
Br. Lassell	Wm. Sprosly.
Mozart	James Cuneo.
Ollers	John P. Bevis.
Plato	James Dixon.
Belg. s. s. Zone	
Leyland Line.	
Br. s. s. Istrian	Robert Leask.
Virginian	M. Fitt.
Mallory Line.	
Am. s. s. Alamo	Sam. Risk.
Lampasas	M. B. Crowell.
San Marcos	A. C. Burrows.

Name of vessel.	Captain.
Mediterranean & New York Steamship Co.	
Br. s. s. Pontiac	Capt. J. H. Martin.
Ponca	William Bowen.
Mon. & Dominion S. S. Co.	
Br. s. s. Montreal	F. Bouchette.
Ontario	W. P. Couch.
Toronto	Jas. McAuley.
Monarch Line.	
Br. s. s. Assyrian Monarch	John Harrison.
Egyptain Monarch	W. S. Morgan.
Grecian Monarch	B. J. W. Bristow.
Lydian Monarch	Thos. C. Huggett
Persian Monarch	J. Watson.
Morgan's La. & Texas R. R. & S. S. Co.	
Am. s. s. Chalmette	Robt. B. Quick.
El Dorado	J. W. Hawthorne.
Lone Star	Geo. W. Mason.
National Line.	
Br. s. s. Canada	Wm. Pearce.
Denmark	Geo. Cochrane.
Egypt	R. W. Grace.
England	T. P. Healey.
Erin	John Robinson.
France	A. D. Hadley.
Greece	A. J. Jeffrey.
Helvetia	John Milligan.
Holland	Wm. Tyson.
Italy	James Sumner.
The Queen	James Sumner.
Navigazione Generale Italiana.	
It. s. s. Archimede	Domenico Viola.
Castardo	G. Dilliberto.
Plata	Luigi Cassorick.
New York and Cuba Mail S. S. Co.	
Am. s. s. Clenfuegos	C. M. Faircloth.
N. Y., Havana & Mexican Mail S. S. Co.	
Am. s. s. City of Alexandria	J. W. Reynolds.
City of Washington	W. M. Rettig.
North German Lloyd Steamship Co.	
Ger. s. s. America	G. Meyer.
Donau	C. Pohle.
Elder	H. Helmers.
Ems	W. Willigerod.
Fulda	R. Ring.
Hermann	H. Baur.
Main	H. Christoffers.
Neckar	F. Pfeifer.
Werra	Richard Bussius.
Weser	H. Bruns.
Occidental and Oriental Steamship Co.	
Br. s. s. Oceanic	John Metcalfe.
Ocean Steamship Company.	
Am. s. s. City of Augusta	K. S. Nickerson.
Juniata	S. L. Askins.
Chattahoochee	J. W. Catharine.
Oceanic Steamship Company.	
Am. s. s. Mariposa	H. M. Hayward.
Old Dominion Steamship Company.	
Am. s. s. Manhattan	Frank Stevens.
Oregon Railway and Navigation Co.	
Am. s. s. City of Chester	Thomas Wallace.
Columbia	Fred Bolles.
Geo. W. Elder	H. S. Achley.
Oregon	E. Fuhrmann.
Pacific Coast Steamship Company.	
Am. s. s. Orizaba	John N. Ingalls.
Santa Rosa	C. B. Johnson.
State of California	G. Debney.
Pacific Mail Steamship Company.	
Am. s. s. City of New York	Robt. R. Searle.
City of Para	L. Dexter.
City of Peking	G. G. Berry.
City of Rio Janeiro	Wm. H. Cobb.
City of Sydney	H. C. Dearborn.
Colima	J. M. Caverly.
Colon	Chas. C. Lima.
Granada	W. B. Seabury.
San Blas	Thos. Chapman.
San Jose	A. D. Austin.
Pyman Watson Steamship Company.	
Br. s. s. Netley Abbey	H. N. Vyvyan.
Quebec Steamship Company.	
Br. s. s. Muriel	G. S. Locke.
Orinoco	Jas. S. Garvin.
Trinidad	W. J. Fraser
Red Cross Line.	
Br. s. s. Cacouna	John Jellard.
Thereson	I. Hempthorne.
Red "D" Line.	
Am. s. s. Caracas	W. M. Hopkins.
Philadelphia	Sam. Ross.
Maracaibo	Wm. Woodrick.
Red Star Line.	
Belg. s. s. Belgenland	W. A. Beynon.
Nederland	Allen J. Griffin.
Noordland	H. E. Nickels.
Pennland	Rud. Weyer.
Rhynland	J. C. Jamison.
Switzerland	H. Buschmann.
Waesland	J. Ueberweg.
Westernland	Com. W. G. Randle.
Zeeland	Capt. L. De Smet.
Rotterdam Line.	
Dtch. s. s. Edam	J. H. Taat.
Leerdam	P. Sliecendregt.
P. Caland	T. H. Bonjer.
Schiedam	G. Bakker.
W. A. Scholten	G. J. Vis.
Zaandam	H. van der Zee.
State Line.	
Br. s. s. State of Georgia	G. Moodie.
State of Nebraska	A. G. Brass.
State of Nevada	John A. Stewart.
State of Pennsylvania	Alfred Mann.
Thingvalla Line.	
Dan. s. s. Geiser	C. W. Møller.
Hekla	A. G. Thomsen.
Thingvalla	S. T. H. Lund.

Name of vessel.	Captain.
Tyne and Wear Steamship Company.	
Br. s. s. City of Newcastle	Capt. W. T. Irving.
U. S. and Brazil Mail S. S. Co.	
Am. s. s. Advance	Jas. R. Beers.
Warren Line.	
Br. s. s. Iowa	Samuel Walter.
Kansas	Wm. Gleig.
Missouri	R. Poland.
Norseman	E. Maddox.
Roman	D. Williams.
White Cross Line.	
Belg. s. s. De Keyser	J. J. Bracens.
Hermann	D. Meyer.
Jan Breydel	H. Meyer.
Pieter de Coninck	E. Smit.
White Star Line.	
Br. s. s. Adriatic	H. Parsell.
Baltic	Geo. Burton.
Britannic	H. Perry.
Celtic	Benj. Glendell.
Germanic	C. W. Kennedy.
Republic	P. J. Irving.
Wilson Line.	
Br. s. s. Bravo	Charles Smith.
Bassano	W. Rea.
Chicago	J. W. Jones.
Galileo	Richard Potter.
Rialto	Wm. Rippeth.
Salerno	Wm. Abbott.
Watts, Ward Line.	
Br. s. s. Acton	R. P. Gowling.
Miscellaneous.	
Br. s. s. Aborace	Robt. Temple.
Craighill	W. H. Bennett.
Cranbrook	John W. Harvey.
Edith Golden	John H. Bennett.
Span. s. s. Hugo	A. de Mugica.
Br. Joseph Fersen	John J. Mehegan.
Am. Lorenzo D. Baker	Warren F. Wilcox.
Span. s. s. Navarro	S. de Aldecoces.
Br. s. s. Prydian	Moses Parry.
Br. Rydal Water	J. H. Jones.
Stag	James Adams.
Salina	Thomas Potter.
Nortumana	C. E. Cook.
Viola	L. Murray.
"New York Herald Weather Service."	
Am. s. s. Acapulco	W. G. Shackford.
Br. Adriatic	H. Parsell.
Am Advance	J. R. Beers.
Br. Ailsa	J. W. Sansom.
Albano	H. R. Hughes.
Alene	E. J. Seibers.
Am. Algiers	J. B. Percy.
Br. Alva	D. Williams.
Br. Artzona	Sam. Brooks.
Baltic	G. Burton.
Belg. Belgenland	W. A. Beynon.
Br. Britannic	H. Perry.
Am. City of Alexandria	J. W. Reynolds.
Br. City of Chicago	Fred Watkins.
Celtic	Benj. Glendell.
Am. City of Puebla	John Deaken.
Br. Claribel	T. M. McKnight.
City of Richmond	Arthur Lewis.
Am. Colon	Chas. Lima.
Chalmette	Robt. B. Quick.
Ger. Ems	W. Willigerod.
Br. Gallia	M. Murphy.
Dan. Geiser	F. V. Schierbeck.
Ger. Lessing	B. Voss.
Belg. Nederland	A. J. Griffin.
Br. Olympia	James Brown.
Oregon	P. Cottier.
Orinoco	S. Garvin.
Dtch. P. Caland	F. H. Bonjer.
Br Persian Monarch	Jas. Watson.
Belg. Pennland	R. Weyer.
Br. Republic	P. J. Irving.
Belg. Rhynland	J. C. Jamison.
Am. San Marcos	Ch. Off. A. B. Connor.
Dtch. Schiedam	Capt. G. Bakker.
Br. State of Pennsylvania	A. J. Mann.
State of Nebraska	A. G. Brass.
Belg. Switzerland	H. Buschmann.
Fr. St. Laurent	M. de Jonsselin.
Dtch. W. A. Scholten	G. J. Vis.
Belg. Westernland	Com. W. G. Randle.
Sailing vessels.	
Am. bg. Abbie Clifford	Capt. D. W. Storer.
Am. sc. Abbie H. Gheen	W. W. Gheen.
Ger. sp. Agra	A. Hilgemann.
Am. bg. Arcot	J. W. Cates.
Am. sp. Berlin	J. W. Dickinson.
Ger. bk. Betty	S. Wahlmuth.
Br. sp. Charles S. Whitney	Geo. D. Spicer.
Ger. sp. Columbus	B. Sauermilch.
Br. sp. City Camp	D. McLeod.
Am. sc. Ettie H. Lister	Smith D. Mason.
Am. sc. Edward R. Emerson	A. H. Child.
Br. bk. Exito	George J. Pearce.
Dan. bk. Galeon	H. H. Kalsboll.
Ger. sp. Georg	G. A. Scholtz.
Am. schr. Governor Hall	John Cain, jr.
Nor. bk. Gruenthven	O. G. Killingsen.
Am. sc. Harriet S. Jackson	W. T. Bacon.
Am. sc. Henry Waddington	W. H. Mugee.
Am. bg. L. & W. Armstrong	A. Alexander.
Br. bg. Harry and Aubrey	J. N. Tedford.
Am. bg. L. F. Munson	Jas. A. Smith.
Br. bg. Lilias	H. F. Schive.
Am. bkt. Louise Adelaide	Edgar Ott.
It. bk. Rosina	G. Tomaselli.
Am sp. Rembrandt	J. W. McGilvery.
Am. bk. Tenerife	Nathan S. Tracy.
Ger. bk. Western Chief	Fr. Sander.
Am. sc. Wm. H. Stuart	Charles Brown.

MONTHLY WEATHER REVIEW.

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INTRODUCTION.

This REVIEW contains a general summary of the meteorological conditions which prevailed over the United States and Canada during February, 1886, based upon the reports from the regular and voluntary observers of the Signal Service and from co-operating state weather services.

Descriptions of the storms which occurred over the north Atlantic Ocean during the month are also given, and their approximate paths shown on chart i.

A series of remarkably low barometric readings were reported over the ocean west of the fortieth meridian from the 24th to the 28th, inclusive; pressures below 29.0 continued throughout this period.

The average number of areas of low pressure during February in the last twelve years is 11.8, or 2.8 greater than the number traced on chart i for February, 1886.

The temperature has been below the normal by from 1° to 7° in the districts east of the one-hundredth meridian, except in the Canadian Maritime Provinces, where it was slightly above the normal; to the westward of the meridian mentioned the month has been warmer than the average, the departures above the normal temperature being most marked in the northern slope, where they ranged from 10° to 16°.

The minimum temperatures recorded from the 3d to 5th, during the passage of high area number i, were, generally, the lowest observed in February since the establishment of Signal Service stations; this was especially the case in the Ohio Valley, Tennessee, and in the Atlantic and Gulf States.

A decided excess over the average precipitation is shown in New England and the middle Atlantic states, while marked deficiencies occurred on the Pacific coast, in the Gulf States, and central valleys.

The excessive rains in southeastern New England from the 10th to 14th, during the prevalence of low area ii, may be considered one of the most important features of the month. These heavy rains resulted in freshets which caused the destruction of much property in Massachusetts, Rhode Island, and Connecticut.

An additional chart, number v, is issued with this REVIEW; it shows the oscillations of atmospheric pressure and temperature during the month, as charted from the tri-daily telegraphic observations, for the following stations: Eastport, Maine; New Orleans, Louisiana; Portland, Oregon; and Saint Paul, Minnesota.

In the preparation of this REVIEW the following data, received up to March 20, 1886, have been used, viz., the regular tri-daily weather-charts, containing data of simultaneous observations taken at one hundred and thirty-three Signal Service stations and twenty-one Canadian stations, as telegraphed to this office; one hundred and fifty-eight monthly journals and one hundred and sixty-five monthly means from the former, and twenty-one monthly means from the latter; three hundred and eleven monthly registers from voluntary observers; fifty-nine monthly registers from United States Army post surgeons; marine records; international simultaneous observations; marine reports through the co-operation of the "New York Herald Weather Service;" abstracts of ships' logs, furnished by the publishers of "The New York Maritime Register;" monthly weather reports from the New England Meteorological Society, and from the local weather services of Alabama, Illinois, Indiana, Minnesota, Missouri, Nebraska, Ohio, and Tennessee, and of the Central Pacific Railway Company; trustworthy newspaper extracts, and special reports.

ATMOSPHERIC PRESSURE.

[*Expressed in inches and hundredths.*]

The mean atmospheric pressure for February, 1886, determined from the tri-daily telegraphic observations of the Signal Service, is shown by isobarometric lines on chart ii.

The mean pressure is greatest over the middle slope and middle plateau; it is least over the Canadian Maritime Provinces. The isobar for 30.25 incloses the area of barometric maxima, and that for 29.9 indicates the region of least pressure. The barometric means have generally exceeded 30.1 in all parts of the country, except over the northern districts eastward of the upper Mississippi valley, in southern Arizona, and along the Gulf and Pacific coasts. The highest and lowest barometric means, 30.27 and 29.89, are reported from Salt Lake City, Utah, and Sydney, Nova Scotia, respectively.

As compared with the mean pressure for the preceding month, a decrease is shown over the southern portions of Arizona and Californa; also in northern Texas, Indian Territory, Kansas, Nebraska, and over the northern districts from western Montana eastward to the New England coast. The decrease is most marked in the extreme northwest and Canadian Maritime Provinces, where it amounts to .15. To the southward of the Lake region and upper Mississippi valley, and over an area extending from the west Gulf states to the north Pacific coast, the barometric means are higher than for January, the increase being greatest on the north Pacific coast, where it ranges from .10 to .15.

The departures from the normal pressure at the various Signal Service stations are given in the tables of miscellaneous meteorological data, and on chart iv they are shown by lines connecting stations of equal departure. Along the Atlantic coast, and over the northern districts from the lower lake region westward to Washington Territory, the mean pressure is below the normal; it is also below the normal in the lower Missouri valley, California, and southern Oregon; the departures in the districts named are generally less than .05, except in New England where they range from .05 to .09. In the Ohio Valley, west Gulf states, Rio Grande Valley, north Pacific coast region, and in the northern and central Rocky Mountain districts, the mean pressure for February, 1886, is above the normal, the departures nowhere exceeding .06.

BAROMETRIC RANGES.

The following are some of the extreme monthly ranges:

Greatest.	Inches.	Least.	Inches.
Eastport, Maine	2.32	San Diego, California	0.43
Portland, Maine	2.07	Key West, Florida	0.50
Mount Washington, New Hampshire	1.91	Los Angeles, California	0.51
Boston, Massachusetts	1.76	Fort Grant, Arizona	0.53
Mackinaw City, Michigan	1.54	San Louis Obispo, California	0.55
Escanaba, Michigan	1.49	Fort Thomas, Arizona	0.58
New London, Connecticut	1.48	Fort Apache, Arizona	0.60
Block Island, Rhode Island	1.47	San Francisco, California	0.63

The monthly barometric ranges at the various Signal Ser-

vice stations are also shown in the tables of miscellaneous meteorological data; they were greatest in New England, where they were unusually large, Eastport, Maine, reporting 2.32, and Portland, Maine, 2.07. The smallest ranges, as usual, are shown over the southern districts, San Diego, California, reporting the least, 0.43. Except at Tatoosh Island, Washington Territory, where a range of 1.04 occurred, the monthly ranges do not exceed 1.00 to the west of the one-hundredth meridian.

AREAS OF HIGH PRESSURE.

Seven areas of high pressure were observed within, or near, the limits of the stations of observation during the month of February. These areas generally appeared first on the Pacific coast, but the maximum pressures were, as usual, observed near the centre of the continent. There was an exception to this, however, in the case of high area number ii, which was attended by the highest barometric readings observed during the month, as it passed to the northeast of New England from northern Canada. The high areas that passed within the limits of the stations of observation were attended by cold waves, and as they approached the Atlantic the pressure decreased. Two of these areas disappeared off the south Atlantic coast; two passed eastward to New England from the north Pacific coast, leaving the pressure above the normal over the plateau and Rocky Mountain regions. The direction of movement was easterly in the regions west of the Rocky Mountains, probably inclining slightly to the north of east; it was to the southeast east of the Rocky Mountains, except in two cases, when the high areas were apparently forced to the north of east as they approached the Atlantic coast.

I.—The morning report of the 1st indicated the approach of a cold wave from the region north of Dakota, the temperature in that section being 20° below zero within the limits of this area of high pressure. The barometer had risen over the central valleys, while areas of low pressure extended over the Saint Lawrence and lower Colorado valleys. The temperature was also 20° below zero at stations north of the lower lake region on the morning of the 1st. During the 1st and 2d the pressure increased in the Northwest and the low area central over the southern plateau region moved eastward, forming a well-defined cyclonic disturbance in the lower Mississippi valley. This distribution of pressure resulted in a rapid increase of the barometric gradient over the central valleys and on the eastern Rocky Mountain slope. The barometer continued to rise at the northern stations, and by midnight of the 2d it had risen to 30.85 in Manitoba. The maximum pressure due to this area, 30.92, was observed at Fort Garry, Manitoba, on the morning of the 3d, but the attending cold wave had extended southward to the west Gulf coast and over all districts east of the Mississippi, except the south Atlantic states. Heavy snows occurred in the northern quadrant of the storm which passed over the Southern States, immediately to the south of this high area, and as the temperature fell to the eastward the snows extended along the Atlantic coast during the 3d and 4th. The movement was to the southeast during the 4th, although the centre of greatest pressure remained near Lake Superior. The barometer rose in the central Rocky Mountain region, forming a secondary high area, after which the centre of the principal high area moved southward to the Mississippi Valley. At the 10 p. m. report of the 4th the pressure exceeded 30.60 at Cairo, Illinois, and at stations in that vicinity, and generally clear, cold weather prevailed in all districts. The temperature was below freezing along the east Gulf coast, and below zero from New England westward to Iowa. During the 5th the barometer rose on the Atlantic coast, but it did not reach the height observed in the western districts. This area disappeared on the 6th, moving slowly to the east of the coast line. The secondary area of high pressure which formed over Colorado became well defined on the 6th, being enclosed by the isobars of 30.60, 30.50, and 30.40. It remained almost stationary until the 7th, when it slowly disappeared by a gradual decrease of pressure.

II.—This area appeared in the extreme northeast, although it probably extended westward to Manitoba on the 9th. A storm of slight energy was moving southward over the Missouri Valley, apparently following the general direction of the course of this high area. The pressure increased rapidly at the extreme northeast stations, the rise ranging from 0.7 to 1.0 in sixteen hours. During this rapid increase of pressure the storm, which had previously moved southward over the Missouri Valley, changed its course during the succeeding twenty-four hours and moved almost directly north, and disappeared by loss of energy and gradual increase of pressure, leaving, however, a secondary storm-centre in the barometric trough which extended southward to the Gulf coast. This high area was at no time wholly within the limits of the field of observation, but it moved slowly southeastward during the 10th, 11th, and 12th, the barometer reaching its maximum, 31.01, at Anticosti, Province of Quebec, on the 11th, while it exceeded 30.90 in northern New England; on the 12th the direction of wind at the Canadian stations indicated that the centre had passed to the east of Nova Scotia, and by the 13th it had passed over the Atlantic.

III.—This was a slight area of high pressure which approached from the Pacific coast and extended over the central plateau region on the 10th. It moved slowly eastward during the 11th and 12th, and disappeared by a gradual fall of the barometer in the Rocky Mountain regions, unattended by marked change in the weather or temperature.

IV.—This area of high pressure was also first observed on the Pacific coast; it apparently followed the coast line, moving slowly northward during the 12th, 13th, and 14th, when it was re-enforced from the northeast by the resulting area of high pressure extending from Manitoba to California; the eastern portion moved rapidly southward, following the course of the Missouri Valley, and thence eastward over the Ohio Valley, while the western portion moved to the north Pacific coast, where it remained almost stationary from the 15th to the 18th.

V.—On the 19th this area of high pressure appeared to the north of Montana and united with that on the Pacific coast, and moved rapidly southward over the east slope of the Rocky Mountains. The barometer fell during the southeast movement; it was central in southern Missouri on the morning of the 20th, but after that date it could not be defined by the bounding isobars, but it was felt as a slight cold wave while passing over the Gulf States; the morning chart of the 21st exhibited the last trace of this area of high pressure on the south Atlantic coast.

VI.—This area appeared on the north Pacific coast on the 20th immediately to the west of the storm-centre, and it passed to the southeastward over Colorado during the following day, following the storm previously referred to, which had reached the upper lake region. Both the low and high areas moved to the southeast during the 22d; the area of high pressure became much larger and a portion passed over the Southern States, while the greater part remained over the Maritime districts. The area of low pressure referred to disappeared before reaching the Atlantic coast, and a second storm appeared in the Northwest, which passed rapidly eastward, north of the Lake regions. The area of high pressure, which had remained almost stationary in the mountain regions several days, followed this northern storm-centre, and it presented the only case observed during the month of an area of high pressure moving to the north of east from the interior of the continent to the Atlantic coast; it was also the only high area within which the pressure increased during the transit east of the Mississippi. It passed over northern New England during the 25th, and was east of Nova Scotia on the night of the 25th.

VII.—This area of high pressure was first observed on the north Pacific coast on the 24th, but it was at no time wholly within the limits of the United States; it passed eastward, north of the stations of observation, increasing in energy, and was apparently central north of Dakota on the 25th. During the two succeeding days it passed over Minnesota and to the

Lake regions, where it remained until the close of the month. The pressure increased at the centre, and during the 28th there was an apparent movement to the west. It was attended by a severe cold wave, and the area extended from the Saint Lawrence Valley to the Rocky Mountains. The eastern movement was apparently retarded by the severe storm immediately to the east of New England; the barometric gradient to the west from Nova Scotia was unusually great, the difference of pressure being 1.86 between the low and high areas, which were not distant from each other.

AREAS OF LOW PRESSURE.

Nine areas of low pressure were traced on the tri-daily weather charts during February; six were first observed in the regions north of Montana and Dakota; one appeared first in the central Rocky Mountain regions, and two advanced northeastward from the lower Rio Grande valley. Referring to the course or direction of movement, six passed to the east of the Atlantic coast, five of which reached the coast north of the latitude of Boston, Massachusetts. Low areas originating to the northwest of Dakota, generally moved southeastward when to the west of the Mississippi River, and all moved to the north of east as they approached the Atlantic coast.

The following table gives the latitude and longitude in which each area of low pressure was first and last observed, with the average hourly velocity of each.

Low areas.	First observed.		Last observed.		Average velocity in miles per hour.
	Lat. N.	Long. W.	Lat. N.	Long. W.	
	° ′	° ′	° ′	° ′	
No. I *	28 00	99 00	37 00	72 00	38.0
II	45 00	97 00	44 00	92 00	16.0
II a	35 00	93 00	40 00	91 00	43.0
II b	30 00	91 00	50 00	63 00	22.0
II c	34 00	80 00	45 00	79 00	40.0
III	58 00	111 00	46 00	93 00	20.0
III a	44 00	97 00	43 00	80 00	25.0
IV	30 00	98 00	52 00	62 00	54.0
V	52 00	105 00	48 00	64 00	30.0
VI	53 00	104 00	43 00	76 00	33.0
VII	54 00	109 00	50 00	61 00	48.0
VIII	52 00	110 00	47 00	59 00	28.0
IX	39 00	104 00	33 00	95 00	22.0

* This storm probably developed to the west of the longitude given and continued its northeast movement along the Atlantic coast.

I.—The morning weather chart of the 1st exhibited two areas of low pressure, one passing eastward over New England and a second central on the Pacific coast south of California, and between these areas was a well-marked area of high pressure extended over the Northwest, attended by a decided cold wave. The track of the centre of number i is extended to the westward of the point where its centre was first located, as an indication that it probably originated on the south Pacific coast. On the morning of the 2d this storm was central in the extreme southern portion of Texas; it developed quickly and became a well-defined cyclonic area, which passed almost directly east, over the Gulf States, to the south Atlantic coast during the 2d and 3d, attended by very heavy snows in the northern quadrant south of the Ohio Valley. The barometer remained almost stationary at the centre, and slightly above 29.70, while this disturbance remained over the land, but the area of high pressure immediately to the north moved towards the storm, thus causing a rapid gradient in the northern quadrant of the low area and a severe "norther" to the west of the storm-centre. This storm passed to the east of the south Atlantic coast on the 3d, but its course changed to the northeast when the centre reached the vicinity of the Gulf Stream. Its movement to the northeast can be readily traced from the coast reports to the northeast of Hatteras, North Carolina, and it was probably near, and to the east of, Sydney, Nova Scotia, on the 5th.

II.—Previous to the appearance of this storm in the Northwest a slight depression moved southeastward to the Lake region, causing light snows at the more northern stations, but quickly disappeared, by increase of pressure, before reaching the coast; this was followed by an extended depression in the Northwest and north of the Lake region, the lowest isobar (29.60) forming a loop to the southwest, within which this storm developed during the 8th. It moved directly south until the afternoon report of the 9th, with increasing energy and decreasing pressure; the afternoon report of the 9th showed a well-marked storm-centre in eastern Kansas bounded by an isobar of 29.50; at this report the isobars encircling the storm were almost circular, and those of 29.50, 29.60, and 29.70 bounded the storm, while the pressure had increased rapidly to the northward, causing a rapid gradient which resulted in high winds and gales on the east slope of the Rocky Mountains during the 9th. These high winds extended eastward over Dakota and Minnesota, but to the south of the storm-centre, and dangerous southerly winds occurred on the same date in southern Texas. The unusual track of this storm, and its secondary low areas, is given on chart i as number ii. It will be seen that after reaching eastern Kansas the direction of movement changed from south to north and the centre approached the vicinity of Saint Paul, Minnesota, where it disappeared, but an extended barometric trough was formed, covering the Mississippi Valley and the Gulf coast. During the northerly movement of this storm the pressure increased slowly at the centre, thus indicating that it was losing energy. A secondary low area formed over Arkansas on the afternoon of the 10th, and there are indications that a third depression existed still further to the southward over the west Gulf states. The barometric trough containing these secondary depressions moved slowly eastward, and at 10 p. m. of the 10th it extended from Lake Superior to the Gulf coast, with a slight depression in the vicinity of Saint Louis, Missouri. The secondary depression disappeared as it moved to the north, and a third low area formed over the lower Mississippi valley on the 11th, which, after reaching the east Gulf states, moved directly north to the Lake region. During the northerly movement of this area the well-marked high areas extending over the northeast and the mountain districts in the West became less clearly defined. After reaching the southern part of Lake Michigan the depression remained almost stationary until the fourth low area, which had formed over the south Atlantic states on the 12th, passed along the middle Atlantic coast and thence to the upper Saint Lawrence valley, where the two storm-centres united on the morning of the 13th. After these centres united the storm moved directly to the northeast; the barometer fell rapidly as the centre passed over the Maritime Provinces during the 13th, reaching the minimum (29.15) at Father Point, Province of Quebec, at 10 p. m. This storm was most severe after passing to the northeast of New England.

III.—This was first observed north of Montana on the 11th, and moved southeasterly until the 11 p. m. report of the 12th, when it was last observed immediately north of Minnesota, but at the same report a secondary low area formed in the Missouri Valley, and moved east over the Lake region as an extended but feeble depression without sufficient energy to carry it to the coast; it therefore disappeared, as indicated on chart i, within the limits of the stations of observation.

IV.—This storm developed in southern Texas on the 14th, when the barometer was from .2 to .5 above the normal over the regions west of the Mississippi and generally below the normal in the eastern districts. It moved with great rapidity (the average hourly velocity being over fifty miles) directly to the east, becoming more severe as it advanced, until it reached the stations in the extreme northeast, where the most severe gales occurred. Dangerous winds also occurred at stations on the coast of the United States north of Hatteras, North Carolina, but they were usually off-shore, and to the west of the storm-centre. The precipitation attending this storm at stations within the limits of the United States was very slight, and was generally in the form of light snow at stations to the north and west of the storm-centre. The barometer was low to the northeast of this storm when it developed, and was

decidedly above the normal at the Rocky Mountain stations. The advance of the high area to the southeast probably caused the rapid movement of this storm to the northeast.

V.—Was first observed north of Montana on the 17th; it moved to the southeast during the 18th, over the upper lake region, followed by a cold wave and severe gales at the northern stations. The pressure decreased as the storm moved eastward, and the lowest reading, 28.90, was observed at Anticosti, Province of Quebec; at Eastport, Maine, on the 20th, the barometer fell to below 29.0. The pressure increased rapidly to the west, and when this low area was central northeast of New England some of the most severe gales of the month occurred in the Lake regions and in the Saint Lawrence Valley. It was last observed as central near Anticosti, Province of Quebec, on the 20th, but the easterly movement was apparently retarded, causing the gales to continue in this region until the 22d.

VI.—This storm was observed north of Dakota and moved over a southeast course to the upper lake region; it followed the preceding storm without an intervening high area, while the barometer rose in the Southern States immediately after the storm reached the Lake region. This increase of pressure was apparently due to the advance of a portion of the high area then extending over the Rocky Mountain districts. The result of the advance of the high area was the filling up of this storm before it reached the Atlantic coast; the movement of the secondary high area was in this case from the southwest. This storm was attended by light snows in the northern districts, but it caused no change in the weather conditions of the Southern States.

VII.—This depression was at no time within the limits of the United States, but its movement eastward can be readily traced on the weather charts by the tri-daily telegraphic reports, from which its centre can be approximately located during its transit from north of Dakota to the lower Saint Lawrence valley. The weather continued generally fair within the United states, except at some of the Lake stations, where light snows occurred. This storm track was far to the north of the stations of observation; the movement was rapid, and it was followed by the high areas then located to the Southwest, the latter apparently moving to the north of east.

VIII.—This storm is not traced on chart i to the west of longitude 110°, but the reports from the Pacific coast indicate that it originated west of the Rocky Mountains; this storm also moved southeastward over the upper lake region, following the same general course marked out for the three preceding storms, and was attended by severe gales and also the lowest barometer readings of the month; on the 25th, when the centre was near Mackinaw City, Michigan, the barometer fell to 29.09, while in Manitoba and Nova Scotia it was above 30.40. The gradient was steep in all quadrants of this storm and the temperature was as low as zero at Halifax, Nova Scotia, and at Saint Paul, Minnesota, while it was 39° above at Mackinaw City, Michigan, near the centre of the storm. During the easterly movement it increased in severity, and dangerous gales occurred in the Northern States; on the night of the 25th the centre of this storm passed over northern New England, causing very heavy snows, and the most severe gales of the month occurred on the 26-27th when the pressure was 28.56, at Eastport, Maine. The barometer was 1.00 lower at Eastport, Maine, than it was at Albany, New York, and .5 lower at Boston, Massachusetts, than at Albany, while there was a difference of pressure of 1.63 between Halifax, Nova Scotia, and Toronto, Province of Ontario. This storm moved much slower than the average rate while passing over the New England coast, where the course changed to the northeast.

The following extracts from observers refer to the weather conditions attending this storm:

Chincoteague, Virginia: a violent northwest gale occurred on the 26th, the wind reaching a velocity of sixty-one miles per hour; several slight casualties were reported, but no serious damage done. The cautionary signal which had been flying was changed to off-shore signal at exactly the proper time to be of great value to the shipping interests.

Washington City: a severe wind storm occurred on the 26th; several houses were unroofed, trees blown down, and considerable damage done in various parts of the city.

Baltimore, Maryland: a heavy gale occurred on the 26th; many houses were unroofed, signs and fences blown down, and trees uprooted. The gale on Chesapeake Bay was very severe, but only a few vessels left port during the display of the cautionary signal,

Frederick, Frederick county, Maryland: a terrific wind storm occurred on the 25–26th; a school house was blown down, and considerable damage done to other property.

Westminster, Carroll county, Maryland: a violent wind storm began at 10 p. m. of the 25th, which continued, with increased violence, throughout the 26th; trees were uprooted, chimneys and fences blown down, and considerable damage done in all sections of the county.

Havre de Grace, Harford county, Maryland: a terrific northwest gale occurred on the 25–26th; during its height the immense "traveller" used on the Baltimore and Ohio new railroad bridge, for raising iron work, was lifted up and blown down. It was forty feet high, and weighed one hundred tons.

Harrisburg, Dauphin county, Pennsylvania: a wind storm of a most disastrous character occurred on the 25–26th; houses were unroofed, and two of the largest stand-pipes of the Lochiel Iron Works were blown down. The damage throughout the county was considerable.

Philadelphia, Pennsylvania. a heavy northwest gale set in shortly after midnight of the 25th and continued throughout the 26th, the wind reaching a velocity of forty-eight miles per hour and doing great damage in the city.

Wilmington, New Castle county, Delaware: the wind storm of the 26th was the most severe that has been felt in this vicinity for several years; a number of houses in the city were unroofed, chimneys blown down, and trees torn up by their roots.

New York City: a westerly gale began at 12.35 a. m. of the 26th, continuing throughout the day and increasing in violence up to 2.30 p. m. when a velocity of seven miles in five minutes was registered, being at the rate of eighty-four miles per hour; the total movement of the wind for the twenty-four hours averaged 42.9 miles per hour, being the greatest daily velocity ever recorded at this station; the gale continued, with but little decrease in violence, on the 27th. This gale was the most severe ever known in this vicinity, both as to duration and violence; telegraph wires were prostrated in every direction, trees and chimneys blown down, houses unroofed, and several persons severely injured.

Poughkeepsie, Dutchess county, New York: a heavy gale occurred on the 25–26th along the Hudson River, tearing branches from trees, demolishing fences, and prostrating telegraph lines.

Port Jervis, Orange county, New York: a heavy gale occurred on the 25–26th, during the prevalence of which the spire of the Reformed church was lifted bodily from its brick foundation and blown over. The damage is estimated at $10,000.

Nyack, Rockland county, New York: an unusually heavy gale occurred on the 26th; shutters were torn from their hinges, trees blown down, and great damage done to property throughout the county.

New London, Connecticut: for severity and duration the storm of the 26–27th was unprecedented in the records of this station. Never since the Norwich and New York Transportation Company began running their boats between this city and New York was a trip missed until the 27th when the steamer "City of Boston" attempted to leave but was compelled to return. For three days none of the freight boats either left or entered this port.

New Haven, Connecticut: a heavy gale occurred on the 26–27th, the wind averaging thirty miles an hour; telegraph and telephone wires were prostrated, buildings unroofed, chimneys blown down, etc.; the steamer "Idlewild" was blown on a rock off Stamford, Connecticut, and sunk; eight lives were lost.

Hartford, Hartford county, Connecticut: The heavy gale of the 26–28th caused considerable damage to telegraph and telephone, wires, trees, signs, etc., and many barns were unroofed.

Westfield, Hampden county, Massachusetts: the heavy wind of the 26th blew down the spire of the Congregational church, causing damage to the amount of $10,000.

Malden, Middlesex county, Massachusetts: an unusually heavy gale occurred on the 26th, the wind reaching almost hurricane violence, and causing considerable damage throughout the city.

Dover, Strafford county, New Hampshire: a severe gale occurred on the 26th, hundreds of trees were blown down, houses unroofed, and telegraph lines prostrated.

Machias, Washington county, Maine: an unusually severe easterly gale occurred on the 25–26th; the schooner "Ximena" was blown on the rocks at this station, breaking her keel and staving in her bottom.

IX.—The reports from the plateau regions and the Pacific coast indicate that this area of low pressure, or the conditions which resulted in its formation, passed from the west of the Rocky Mountains. It moved over Colorado on the 26th, and was apparently forced to the southeastward by the high area then extending over the northern districts; a second depression was also formed in southern Texas on the 27th, but the high area to the northeast moved southward over the central valleys and replaced the low areas, or forced them to the south of the Gulf coast. The indications are that this low area filled up before it reached the Gulf coast.

SIGNAL SERVICE AGENCIES.

Signal Service agencies have been established in the Maritime Exchange buildings at New York City and Philadelphia, and in the Custom-House, Boston, where the necessary blanks and other information will be furnished to ship-masters.

In pursuance of the arrangements made with the Meteorological Office of London, England, there were cabled to that office from New York during February, 1886, eight reports concerning storms encountered by vessels in the Atlantic west of the forty-fifth meridian; one message was sent from Boston.

NORTH ATLANTIC STORMS DURING FEBRUARY, 1886.

[*Pressure expressed in inches and millimetres; wind-force by scale of* 0-10.]

The paths of the depressions that have appeared over the north Atlantic Ocean during the month are determined, approximately, from international simultaneous observations furnished by captains of ocean steamships and sailing vessels; abstracts of ships' logs and other data collected by the Signal Service agencies at the ports of New York, Boston, and Philadelphia; reports received through the co-operation of the "New York Herald Weather Service;" abstracts of ships' logs furnished by the proprietors of the "New York Maritime Register," and from other miscellaneous data, received at this office up to March 21, 1886.

Eleven depressions are traced over the ocean within the region covered by the reports. Four of these, viz., numbers 2, 7, 9, and 11, are continuations of storms which passed into the Atlantic from the North American continent. Of the remainder, the depression charted as number 1 apparently developed off the coast of Cape Hatteras; number 4 seems to have originated in the Caribbean Sea; number 10 appeared over the ocean near N. 33°, W. 55°; and numbers 3, 5, 6, and 8 are shown between N. 42° and 55° and the meridians of W. 20° and 33°. The general direction of movement of these depressions was northeastward, with exception of number 6 whose course was about south-southeast.

The weather over the Atlantic during February, 1886, was of a varied character; from the 6th to the 19th unusually high pressure and fair weather prevailed, steamers in general reporting a fine passage across the Atlantic between these dates. From the 1st to the 6th high gales of force 7–9 prevailed during the passage of low areas numbers 1 and 2, and the last ten days of the month were marked by severe gales, high seas, and extraordinarily low barometer; on each of the days from the 24th to the 28th pressures below 29.00 (736.6) were reported west of the fortieth meridian, accompanied by winds of force 9–10.

The following are brief descriptions of the depressions charted:

1.—This depression appeared on the 1st in N. 37°, W. 67°, with pressure at 29.84 (757.9) to the northward. The s. s. "Wyoming," C. L. Rigby, commanding, in N. 40° 45′, W. 67° 30′, reports a fresh gale, with barometer falling to 29.79 (756.6) at 8 a. m. On the 2d the centre had moved eastward, and is charted in N. 39°, W. 51°, where the pressure had fallen to 29.57 (751.0) at 7 a. m., and the wind had increased to a whole gale, as indicated by the following reports: The s. s. "State of Georgia," S. Moodie, commanding, in N. 40° 30′, W. 68°, had strong gales, continuing until 4 a. m. on the 3d; s. s. "Kansas," W. Gleig, commanding, in N. 42° 35′, W. 61° 12′, had pressure 29.65 (753.1) at 12 noon, and wind from the northwest, blowing a whole gale until the 3d; s. s. "Ontario," W. P. Couch, commanding, in N. 41° 15′, W. 64° 00′, had lowest barometer at 10.20 a. m., followed by winds increasing to the force of a storm; the s. s. "City of Chester," A. Redford, commanding, in N. 44°, W. 54° 15′, experienced a whole gale, setting in from the s. and veering to wnw.; at 10 p. m. the barometer fell to 28.96 (735.6). Wind of hurricane force was reported by Capt. B. Jamieson, of the s. s. "Sidonian," in N. 42° 17′, W. 55° 10′, with barometer reading 29.31 (744.5) at 5 p. m. The s. s. "Roman," David Williams, commanding, had a gale setting in from the nw. and continuing until the 5th; at 12 noon, in N. 41° 42′, W. 64°, the barometer was 29.55 (750.6). In N. 42° 5′, W. 61° 6′, the s. s. "Waesland," T. Ueberweg, commanding, had a strong gale setting in with a sudden squall from the nw. and lowest barometer, 29.62 (752.3), at noon. S. S. "Kansas," W. Gleig, commanding, in N. 42° 35′, W. 61° 12′, reports a strong gale from nw. began at 4 p. m., with barometer rising from 29.65 (753.1) at noon; on the 3d the wind increased to hard gale, with furious squalls, in N. 42° 13′, W. 65° 15′. The depression moved rapidly northeastward, and at 7 a. m. on the 3d is indicated in N. 52°, W. 40°, where the pressure was about 29.50 (749.3).

The following special reports from vessels to the southeast and southwest of this point give an indication of the severity of the storm on this date:

S. S. "British Queen," R. Wills, commanding, in N. 45° 21′, W. 54°, had strong nnw. gale, setting in with heavy squalls, and increasing at noon to a whole gale, furious squalls, and mountainous seas; lowest barometer, 29.57 (748.5), at 4 a. m. Capt. W. W. Black, of the s. s. "Amaryllis," in N. 41° 58′, W. 55° 32′, reports "terrific gale continued from sw., with heavy squalls, rain, and sleet; lowest barometer, 29.45 (748.0), at noon; a strong gale continued on the 4th from sw. to sse., with very heavy squalls and rain." S. S. "Britannic," H. Perry, commanding, had a strong gale, setting in from the se. on the 2d and veering to sw. and w. on the 3d, on which date the barometer fell to 29.59 (751.6) at 4 a. m., in N. 46° 55′, W. 42° 44′. The s. s. "Arizona," Samuel Brooks, commanding, reports a whole gale setting in from the wsw. and continuing until the 4th, with very high breaking sea from the wnw. prevailing during the gale; in N. 47° 49′, W. 36° 51′, the barometer read 29.80 (756.9) at 11 p. m. on the 3d. On the 4th the depression had passed to the northeast where it is charted in N. 54° 30′, W. 31°, and on the 5th it was central off the west coast of the British Isles, in N. 55°, W. 15°.

The intensity of the attendant gales during these last two days may be judged from the following reports:

S. S. "Missouri," R. Poland, commanding, "encountered terrific squalls and high seas on the 4th in N. 50° 45′, W. 27° 24′, and moderate nnw. to sw. gales; violent squalls and high seas on the 5th in W. 30°." Captain de Jousselin, of the s. s. "St. Laurent," in N. 49°, W. 31′, on the 4th, reports the wind set in rapidly from the wsw., with rising barometer and enormous seas, and continued a whole gale through the 5th. S. S. "Circassia," A. Campbell, commanding, in N. 50° 31′, W. 36° 16′, at 7 a. m. on the 4th, had pressure 29.61 (752.1), and wind with force of a storm from the wsw, accompanied by squalls of hurricane violence.

2.—This was a continuation of the depression described as low area i under "Areas of low pressure" in this REVIEW. It passed off the coast on the 3d, and was accompanied by very heavy gales along the coast of the United States during its passage northeastward. On the 4th its centre is indicated near N. 37°, where the pressure was 29.50 (749.3); at 7 a. m. wind gales of force 7 to 8 prevailed from N. 29° to 43°. The pressure increased rapidly to the west of the low area, being 29.90 (759.4) on the coast, and 30.60 (777.2) in the Lake region. Accompanying this steep pressure gradient there was also a parallel temperature gradient of equal intensity over the same area, as shown by the following observations at 7 a. m.: Erie, Pennsylvania, 7°; Kitty Hawk, North Carolina, 36°; s. s. "Leerdam," N. 29° 17′, W. 77° 20′, 73°. These two gradients combined to produce the high wind-velocities experienced by vessels on the ocean, of which the following special reports have been received for February 4th:

The s. s. "Linn O'Dee," A. B. Millar, commanding, in N. 42° 46°, W. 69° 9′, 12.30 a. m., had ne. wind blowing a whole gale and heavy snow storm until 8 a. m.; the wind continued blowing a heavy gale until 4 p. m of the 5th. The ship "Reporter," Robert Bayley, commanding, in N. 36°, W. 72°, had barometer 29.41 (747.0) at 9 p. m., and experienced a whole gale setting in from the sw. and veering to the nw. Capt. Geo. Witchell, of the s. s. "Lutetia," reports: "In N. 33° 12′,

W. 75° 15′, had pressure 29.62 (752.3) at 4 a. m., and westerly winds, with force of a strong gale; on the 5th, in N. 34° 26′, W. 74° 17′, the wind had veered to wnw., and experienced hard squalls, with snow and hail and very heavy seas, which several times broke over the ship."

On the 5th the depression was central near the southern coast of Newfoundland where the pressure had fallen to about 29.35 (745.5); the temperature gradient continued without diminution as may be seen from the following observations: Norfolk, 4° Fahr.; s. s. "Clement," N. 32°, W. 69°, 18′, 56° Fahr.; s. s. "Hugo," N. 29° 32′, W. 60° 37′, 73° Fahr. High gales also prevailed from N. 25° to 50°, but were most violent from the middle Atlantic states southeast to the Bermudas, the area where the temperature and pressure gradients were parallel and of greatest combined intensity. The s. s. "British Queen," R. Wills, commanding, in N. 44° 57′, W. 59° 16′, had pressure 29.36 (745.7) at 4 a. m. and wind of force 7; s. s. "Britannic," in N. 43° 44′, W. 52° 42′, had pressure 29.36 (745.7) at 6 a. m. and wind blowing a strong gale from sw. On the 6th vessels north of N. 45° and between west 30° and 40°, experienced violent gales from the southwest, indicating that the centre of the depression had passed northeastward beyond the limit of observation.

3.—This was a small depression which developed on the 7th, and was apparent on the morning of the 8th near N. 50°, W. 27°; vessels from W. 15° to 32° having rains and moderate to fresh gales. The s. s. "Milanese," John Trinick, commanding, reports strong sw. winds, increasing to a whole gale with heavy squalls, in N. 44° 53′, W. 36°. The s. s. "Pavonia," B. Woolfenden, commanding, had a fresh gale setting in on the 7th from the sw., and in N. 49° 28′, W. 29° the barometer fell to 29.97 (761.2) at 10 a. m. on the 8th. The s. s. "Carthaginian" had strong gale from the south on the morning of the 8th in N. 52° 50′, W. 26° 4′, veering to nw. at 11 a. m. when the barometer fell to 29.82 (757.4). On the 9th the depression had probably passed beyond the limits of observation to the northward; the most northern vessels in N. 55° and 56°, having southerly and southwesterly gales and the lowest barometer readings.

4.—This depression is first reported in the Caribbean Sea, where the "City of Para," L. Dexter, commanding, in N. 14° 33′, W. 77°, reports barometer at noon, February 8th, 29.81 (757.2), with wind from the nw. to nne., moderate to fresh gales; large swell from the nw. and heavy showers of rain. On the 9th the depression was apparent from reports of vessels in the vicinity of N. 26°, W. 73°. The ship "Columbus," Captain Sauermilch, commanding, in N. 26° 30′, W. 71° 15′, had pressure 29.78 (756.4) and wind blowing a fresh gale. The course of the depression was thence northeastward, and its position on the 10th is approximately located from the report of the ship "Georg," G. A. Scholtz, commanding; at 7 a. m., in N. 26° 48′, W. 61° 48′, moderate to fresh gales from ese. and light rains prevailed.

5.—This depression, first charted on the 11th in N. 54°, W. 22°, apparently existed on the 10th further to the southeast as indicated by a report of the s. s. "Carthaginian," which experienced a strong gale setting in from the wnw., in N. 50° 18′, W. 36° 30′, and at noon had lowest barometer, 30.12 (765.0). On the 11th the pressure had fallen to 29.76 (755.9) at 7 a. m., and on the 12th the centre of the depression was off the northwest coast of the British Isles, where the pressure ranged from 29.50 (749.3) to 29.70 (754.4), and vessels westward to the thirty-fourth meridian had high westerly and northwesterly gales. The s. s. "Australia," G. Franck, commanding, reported "a gale setting in from the wsw. on the 11th and continuing until the 14th with the force of a whole gale, accompanied by heavy snow and hail squalls, blowing sometimes with hurricane force; the barometer read unusually high for the season."

6.—Rains and moderate gales on the 12th and 13th near N. 50° and between W. 13° and 40° accompanied the development of this depression, whose centre is charted on the 14th in N. 47°, W. 21°; vessels to the northwest of that position had n. and nnw. gales and pressures ranging from 29.54 (750.3) to 29.80 (756.9), in N. 50°. The s. s. "Ems," W. Willigerod, commanding, in N. 48° 30′, W. 26° 15′, reported fresh to strong gales and high seas from the nnw., with stormy, squally weather. At 7 a. m. on the 15th the pressure on the twentieth meridian had risen to 30.00 (762.0) in N. 50, and fallen to 29.52 (749.8) in N. 44°, where nne. winds, reported by the s. s. "Stag," indicated that the centre of the depression had passed even further to the southward. On the 16th, at 7 a. m., the same vessel, in N. 41° 24′, W. 24° 12′, had pressure 29.88 (758.9) and ne. winds, while the pressure to the southward had fallen to 29.61 (752.1), as reported by the s. s. "Olympia," James Brown, commanding, in N. 33° 51′, where westerly and northwesterly winds prevailed, with force of a fresh gale. The position of the centre of the depression at 7 a. m. was apparently near N. 36°, and on the following day had passed beyond the region of observation.

7.—This was a continuation of low area number iv., described under "Areas of low pressure." At 7 a. m. of the 16th the depression was central north of the Gulf of Saint Lawrence, where the pressure was below 29.40 (746.7). On the 17th the centre of the depression was indicated west of Newfoundland by strong westerly winds, experienced by vessels in N. 44°, between W. 47° and 57°, and southerly winds between W. 39° and 46°, the lowest pressure reported being 29.85 (758.2) by the s. s. "Bassano," in N. 44° 42′, W. 47°, no observations being received to the northward of that position. At 7 a. m. on the 18th the winds between W. 33° and 40° had shifted to the nw. and the pressure to the eastward had fallen from 30.15 (765.8) to 29.80 (756.9); the centre of the depression is charted in N. 48°, W. 30°, in the vicinity of which position the 7 a. m. observations show rain and moderate gales. In the quadrant to the south and east of this position no reports have been received for the 19th and the further track of this depression is discontinued.

8.—This storm appeared suddenly on the 19th between N. 40° and 47° and W. 31° and 38° where vessels reported pressures ranging between 29.21 (741.9) and 29.34 (745.2). On account of the energy displayed by these low readings the depression seems to be a new development rather than a continuation of the depression described as number 7.

The s. s. "Scotland," A. H. Luckhurst, commanding, in N. 46° 57′, W. 32° 38′, reported the wind blowing a storm, and the pressure at 29.26 (743.2) at noon. The depression moved rapidly to the northeast, and at 7 a. m. of the 20th the lowest reported barometer was 29.43 (747.5), in N. 54° W. 20°, after which it passed beyond the region of observation. Vessels to the s. and sw. of this position had high westerly gales on the 20th, as indicated by the following reports:

The s. s. "Galileo," R. Potter, commanding, had fresh gales, with barometer 29.50 (749.3) at 5.30 a. m., in N. 49° 36′, W. 23° 20′. The s. s. "Samaria," in N. 50° 57′, W. 21° 51′, had a fresh gale setting in from the ssw. and pressure 29.80 (756.9) at 4 a. m. The s. s. "Prussian," J. Amburg, commanding, in N. 53° 43′, W. 20° 41′, had a strong gale setting in from the sw. and veering to nw. and lowest pressure, 29.46 (748.3), from 8 to 10 a. m.

9.—This was a continuation of low area number v. At 7 a. m. of the 20th it was central on the coast of Maine, where the barometer was below 29.20 (741.7). On this date vessels near the coast had high winds and rough seas. The following are a portion of the special reports received: The s. s. "Bassano," W. Rea, commanding, in N. 42°, W. 60° 12′, reports the wind set in from the sse., with the force of a whole gale, and veered to the wnw., accompanied by high, confused seas; at 8 p. m. the barometer had fallen to 29.08 (738.6). The s. s. "Holland," W. Tyson, commanding, in N. 42°, W. 64° 34′, had a strong gale from the west and barometer 29.10 (739.1) at 9 p. m. The s. s. "Servia," Horatio McKay, commanding, had a gale beginning at 6 p. m. from the sw.; at 8 p. m. the pressure fell to 29.15 (740.4), after which, the wind, blowing with the force of a strong gale, veered to the nw., accompanied by heavy snow squalls and very cold weather. The s. s. "State of Nevada" encountered a gale setting in from the sw. at 4 p. m.,

in N. 40° 40′, W. 68° 25′, when the barometer fell to 29.25 (742.9); veering to the nw., the gale continued until noon of the 21st. S. S. "Zaandam," H. v. d. Zee, commanding, in N. 40° 46′, W. 68° 56′, had a whole gale and barometer 29.20 (741.7) at 4.30 p. m. At 3 p. m. of the 20th the centre of the depression had reached the Gulf of Saint Lawrence, and on the morning of the 21st is charted off the southeast coast of Newfoundland. Passing from the land to the ocean, the energy of the depression increased; the pressure fell below 28.90 (734.0), and furious gales prevailed eastward and southward of the storm-centre, extending to the meridian of W. 40° and to the parallel of N. 35°.

The following special reports serve to show the intensity of the storm on this date:

S. S. "Ponca," William Bowen, commanding, in N. 35° 30′, W. 58° 18′, had west wind with force of a storm, accompanied by six hours' heavy rain and very heavy swell; the barometer at 7 a. m. recorded 29.61 (752.1), showing a gradient northward to the storm-centre of very nearly .10 inch to each degree. The s. s. "Virginian," M. Fitt, commanding, in N. 42° 33′, W. 54° 7′, reported strong sw. gale, with hard squalls and high seas. The s. s. "Scotland," A. H. Luckhurst, commanding, in N. 45° 31′, W. 39° 48′, reported barometer 29.41 (747.0) at 8 p. m., wind from sw. to nw., a storm. S. S. "England," T. P. Heeley, commanding, in N. 41° 52′, W. 59° 25′, had barometer 29.14 (740.1) at 7 a. m., and gale from the 20th to the 22d from the se. to nw., with force of a storm on the 21st. The steamers "Bassano," "Ethiopia," "Rhynland," "Wisconsin," "Canada," "Pieter de Coninck," and "British Crown," encountered this storm on the 21st, and had pressures ranging from 28.86 (733.0) to 29.13 (739.9) between W. 42° and 63°, with fresh to whole gales from s. to w. The course of the depression was northeastward, and on the 22d the centre had reached W. 35°, the lowest barometer reported on this date being 29.36 (745.7) at 5.30 a. m., by the s. s. "Eider," H. Hellmers, commanding, in N. 47° 45′, W. 33° 40′. Capt. P. Lobbett, of the s. s. "Warwick," in N. 50° 26′, W. 25° 51′, reported a whole gale, setting in from the ssw. and veering to wnw.; the barometer, which during the gale read 29.95 (760.7), continued falling, and remained below 29.00 (736.6) until March 3d. The steamers "Galileo" and "Prussian" reported whole and fresh gales from s. to w., with barometer ranging from 29.66 (753.4) to 29.76 (755.9) between N. 49° and 52° and W. 30° and 32°. On the 23d the lowest reported pressures ranged from 29.70 (754.4) to 29.80 (756.9) in N. 50° and on the 24th at N. 55°, when the depression passed beyond the limit of observation.

10.—Depression number 9 was immediately followed by numbers 10 and 11, during the passage of which the low barometers, above-recorded, continued throughout the remainder of the month. Number 10 first appeared near N. 33°, W. 55°, where the s. s. "Gottardo" had fresh gales from the wnw. and barometer 29.72 (754.9), the pressures to the northward ranging above 30.00 (762.0); the course of the depression was ne., and on the 23d is shown near N. 37°, W. 48°. On the 24th its energy had increased, and pressures ranging from 29.35 (745.5) to 29.40 (746.7) were reported by vessels in W. 39°, N. 44° to 47°, among these was the s. s. "British Princess," E. H. Freeth, commanding, which had wind from the n. and w., a whole gale, six hours' heavy rain and very heavy swell. On the 25th the pressure had risen north of N. 49°, and to the south of that parallel, east of W. 35°, no reports have been received; the further course of this depression, if any, cannot, therefore, be traced. Eastward from W. 35° to W. 65° the winds were controlled by depression number 11.

11.—This was a continuation of low area vii. During the 23d it was central north of the Gulf of Saint Lawrence, where the pressure ranged from 29.70 (754.4) to 29.80 (756.9), and on the 24th it had moved westward to the fifty-third meridian. Like number 9 its energy increased on passing into the ocean. In N. 42° 28′, W. 55° 20′, the s. s. "Pieter de Coninck," E. Smit, commanding, reports wind from the se. to nw., blowing a storm, and pressure 28.92 (734.6) at 1 p. m.; in N. 42°, W. 41° the s. s. "Tyrian" had wind from sw. veering to nw., a hurricane, and barometer reported at 29.06 (738.1) at 4 a. m. The s. s. "Scotland," in N. 34° 44′, W. 49° 32′, "experienced a very furious gale setting in from se. and veering to the nw., blowing with almost hurricane force; at 12 midnight, 24th, the barometer fell to 28.84 (732.5)." The steamers "Eider," "Bohemia," and "Brooklyn City," between N. 42° and 44°, W. 52° to 55°, had pressures ranging from 29.00 (736.6) to 29.25 (742.9), the wind blowing with force of 9–10 and continuing until the 26th; all these vessels had tremendous high, rough seas from the nw. Captain Jas. Brown of the s. s. "Olympia," reports: "Had a continuation of high gales, from sw. to wnw., from the 24th to March 5th, never falling below the force of a fresh gale and going as high as a storm during squalls; the barometer was low during the entire voyage." The depression moved northeastward, and on the 25th controlled the pressure and winds from W. 65° to 35°, manifesting, if possible, increased energy, with the pressure falling to 28.70 (729.0) between W. 46° and 49°.

Captain B. Gleadell, of the s. s. "Celtic," in N. 43° 30′, W. 49° 20′, reports "a whole gale from the e. backing to the nnw. and pressure 28.70 (729.0) at 10 a. m.; the weather preceding and following this disturbance, stormy and unsettled, with high confused seas; during the gale the sea was tremendous, violent, and confused; a very low barometer all the passage." Captain G. Dobson, of the s. s. "Elphinstone," in N. 33° 55′, W. 71° 48′, reports "a gale from the 25th to the 27th, with storm force and barometer 29.58 (751.3) at midnight of the 25th; sometimes the squalls were terrific." Captain Lobbett, of the s. s. "Warwick," in N. 47°, W. 41°, reports "a whole gale on the 25th, with pressure 29.02 (737.1) at 8 p. m.; the barometer read below 29.00 (736.6) from the 25th until March 2d, the lowest reading being 28.60 (726.4), at 2 p. m. on the 27th, in N. 43° 55′, W. 50° 44′." The steamers "Iowa," "Samaria," and "Prussian," between N. 42° and 45° and W. 36° to 59°, report remarkably low barometer, from 28.85 (732.8) to 29.40 (746.7), on the 25th, 26th, 27th, and 28th, with only fresh to moderate breezes and fair weather. On the 26th the centre of the depression was in W. 43°, where the pressure at 7 a. m. was about 29.00 (736.6). During the 27th and 28th the storm moved eastward, and at the close of the month is charted in W. 25°, where the pressure ranged from 29.60 (751.8) to 29.75 (755.6).

During the last three days of the month vessels on the ocean from the coast of the United States eastward to the forty-eighth meridian experienced high winds (of storm-force) developed by low area number viii. This depression on the 26th was central on the coast of Maine, with pressure 28.82 (732.0), and moved eastward until on the 28th it entered the ocean south of Newfoundland. Captain F. Graham, of the s. s. "Biela," encountered the gale on the 27th in N. 30° 40′, W. 66° 55′, and reports: "This gale, with terrific squalls, blew harder and lasted longer than any I have experienced before; the sea was tremendous." On the 27th and 28th pressures below 28.90 (734.0) extended eastward to the forty-eighth meridian, accompanied by snow storms and cold weather, in which vessels were covered with ice. The continuation of this storm over the ocean will be described in the March number of this REVIEW.

OCEAN ICE.

On chart i are also exhibited the positions of ocean ice observed during February, 1886.

These positions are taken from reports furnished by shipmasters and from trustworthy data published in the "New York Maritime Register" and other newspapers.

During this month the eastern limit of icebergs reached W. 44° 47′ in about N. 48°; from that point the outer edge of the ice extended in a southwesterly direction to N. 46° 10′, W. 47° 15′.

The area of the ice region during February, 1886, was materially smaller than in the same month of the years, 1883, 1884, and 1885, as shown by the following:

Southern limit.			Eastern limit.		
Date.	Lat. N.	Lon. W.	Date.	Lat. N.	Lon. W.
	° ′	° ′		° ′	° ′
February, 1883	43 01	52 46	February, 1883	46 19	45 44
February, 1884	43 00	50 00	February, 1884	46 50	43 45
February, 1885	41 50	51 10	February, 1885	47 52	42 00
February, 1886	46 10	47 15	February, 1886	48 00	44 47

Icebergs and field-ice were reported as follows:

14th.—S. S. "Surrey" passed through heavy field-ice and observed three large icebergs in N. 46° 32′, W. 47° 2′. S. S. "Castor," in N. 47° 16′, W. 46° 16′, encountered a large field of ice through which it passed for fourteen hours; the ice was very heavy, being from twelve to fourteen inches thick; steered to the south for eighty miles to clear it.

15th.—S. S. "Palestine," in N. 46° 30′, W. 46° 45′, passed a quantity of field-ice from four to five miles long.

The s. s. "Kehrwieder," at Halifax, February 17th, reported having passed a large field of ice in N. 46° 10′, W. 47° 40′, about thirty miles long, extending southwest to northeast.

16th.—Captain Arthur Lewis, of the s. s. "City of Richmond," encountered field-ice in N. 46° 15′, W. 46° 50′, of which he reports as follows: "3.30 a. m., temperature of the air, 36°; temperature of the water, 42°. 4 a. m., air temperature, 32°; water temperature, 34°. 4.13 a. m., fell in with field-ice, some of it very close; steered southwest about twenty miles to clear it."

18th.—S. S. "Lero" met large fields of floating ice and passed an iceberg in N. 48°, W. 44° 47′. S. S. "Ethiopia," in N. 47° 10′, W. 46° 30′, passed a berg and a large quantity of field-ice.

20th.—S. S. "British Crown," in N. 46° 25′, W. 46° 30°, observed two medium sized icebergs, and in N. 46° 21′, W. 46° 45′, passed twenty miles of field-ice steering southwest.

28th.—S. S. "Polaria" passed an iceberg in N. 46° 10′, W. 47° 15′. S. S. "Vancouver," at Halifax, February 28th, reported a large quantity of thick field-ice in N. 47°, W. 48°; steamed south to get clear of it.

TEMPERATURE OF THE AIR.

[*Expressed in degrees, Fahrenheit.*]

The distribution of mean temperature over the United States and Canada for February, 1886, is exhibited on chart ii by the dotted isothermal lines; and in the tables of miscellaneous data are given the monthly mean temperatures, with the departures from the normal, for the various stations of the Signal Service.

Over the country to the eastward of the one-hundredth meridian, except in the Canadian Maritime Provinces, the mean temperatures are below the normal, the departures being most marked from the Ohio River southward to the Gulf and south Atlantic coasts, where they range from 4° to 7°. In the Canadian Maritime Provinces, and over the country to the westward to the meridian above mentioned, the mean temperatures are above the normal; the departures are slight over the Maritime Provinces, but in the Rocky Mountain region they range from about 3° in the southern plateau to from 10° to 16° in Montana. Along the Pacific coast the mean temperature averaged about 4° above the normal.

The following are some of the most marked departures from the normal:

Above normal.		Below normal.	
	°		°
Fort Assiaaaboine, Montana	16.1	Nashville, Tennessee	7.5
Fort Maginnis, Montana	15.3	Cedar Keys, Florida	7.1
Fort Shaw, Montana	14.5	Cincinnati, Ohio	7.0
Fort Benton, Montana	14.1	Chattanooga, Tennessee	6.5
Helena, Montana	13.1	Louisville, Kentucky	5.9
Spokane Falls, Washington Territory	10.9	Pensacola, Florida	5.9
Fort Custer, Montana	9.3	Cape Henry, Virginia	5.9
Fort Buford, Dakota	8.8	Kitty Hawk, North Carolina	5.7

DEVIATIONS FROM NORMAL TEMPERATURES.

In the table below are given, for certain stations, as reported by voluntary observers, the normal temperatures for February for a series of years, the mean temperature for February, 1886, and the departures from the normal:

Station.	County.	Normal temperature for February.	Number of years.	Mean temperature for Feb., 1886.	Departure.
		°		°	°
Arkansas.					
Lead Hill	Boone	39.4	4	36.2	− 3.2
California.					
Princeton	Colusa	50.5	14	53.8	+ 3.3
Sacramento	Sacramento	48.9	20	53.0	+ 4.1
Connecticut.					
Middletown *	Middlesex	26.8	28	24.9	− 1.9
Dakota.					
Webster	Day	6.0	3	18.1	+12.1
Illinois.					
Anna	Union	38.1	11	33.8	− 4.3
Mattoon	Coles	31.5	6	30.0	− 1.5
Peoria	Peoria	29.2	30	29.2	0.0
Riley	McHenry	22.0	25	19.9	− 2.1
Swanwick	Perry	33.0	4	29.8	− 3.2
Sycamore	De Kalb	21.6	4	21.2	− 0.4
Indiana.					
Lafayette	Tippecanoe	27.8	7	26.2	− 1.6
Mauzy	Rush	23.5	6	23.0	− 0.5
Spiceland	Henry	29.5	32	26.7	− 2.8
Vevay	Switzerland	35.9	21	30.6	− 5.3
Iowa.					
Cresco	Howard	17.8	10	14.2	− 3.6
Monticello	Jones	21.8	32	19.8	− 2.0
Kansas.					
Independence	Montgomery	35.0	14	33.5	− 1.5
Wellington	Sumner	32.0	8	32.0	0.0
Yates Centre	Woodson	29.3	6	31.0	+ 1.7
Maine.					
Bridgeton *	Cumberland	21.0	11	17.5	− 3.5
Belfast *	Waldo	22.3	27	20.1	− 2.2
Cornish	York	21.6	29	18.9	− 2.7
Gardiner	Kennebec	20.6	50	20.6	0.0
Orono *	Penobscot	19.0	18	18.3	− 0.7
Maryland.					
Fallston	Harford	32.1	15	29.7	− 2.4
Massachusetts.					
Amherst *	Hampshire	24.7	49	24.4	− 0.3
Cambridge *	Middlesex	26.1	64	25.6	− 0.5
Fitchburg *	Worcester	24.1	30	22.1	− 2.0
Lowell *	Middlesex	26.5	10	24.0	− 2.5
New Bedford *	Bristol	28.9	74	26.7	− 2.2
Somerset	Bristol	27.4	16	27.2	− 0.2
Springfield *	Hampden	25.6	19	25.0	− 0.6
Taunton	Bristol	28.5	16	27.3	− 1.2
Williamstown *	Berkshire	22.5	34	21.1	− 1.4
Worcester	Worcester	26.3	47	22.2	− 4.1
Nevada.					
Carson City	Ormsby	33.7	7	42.2	+ 8.5
New Brunswick.					
Saint John *	Saint John	20.9	26	19.8	− 1.1
New Hampshire.					
Concord *	Merrimac	24.4	18	23.1	− 1.3
Hanover *	Grafton	19.0	22	17.5	− 1.5
New York.					
Factoryville	Tioga	22.6	4	20.3	− 2.3
Palermo	Oswego	21.5	32	19.0	− 1.9
Plattsburg Barracks	Clinton	17.9	17	15.5	− 2.4
North Volney	Oswego	22.0	18	20.7	− 1.3
North Carolina.					
Raleigh	Wake	47.7	3	39.0	− 8.7
Ohio.					
Wauseon	Fulton	25.5	16	25.0	− 0.5
Pennsylvania.					
Dyberry	Wayne	22.5	22	21.5	− 1.0
Rhode Island.					
Providence *	Providence	27.5	52	27.0	− 0.5
South Carolina.					
Stateburg	Sumpter	50.5	6	44.7	− 5.8
Texas.					
New Ulm	Austin	56.2	14	54.2	− 2.0
Vermont.					
Lunenburg *	Essex	17.3	38	15.4	− 1.9
Newport *	Orleans	17.9	11	14.0	− 3.9
Strafford *	Orange	18.9	11	16.4	− 2.5
Virginia.					
Bird's Nest	Northampton	41.9	18	35.6	− 6.3
Dale Enterprise	Rockingham	32.9	6	32.7	− 0.2
Variety Mills	Nelson	39.1	9	32.6	− 6.5
Wytheville	Wythe	37.0	22	33.3	− 3.7
West Virginia.					
Helvetia	Randolph	34.9	10	29.0	− 5.9

* From the "Bulletin of the New England Meteorological Society."

The following notes on the temperature for February, and the winter months of 1885–'86, are given by voluntary observers:

Arkansas.—Lead Hill, Boone county: the mean temperature for the winter of 1885–'86 is 2°.8 below the average for the past four years.

Illinois.—Riley, McHenry county: the mean temperature for the winter of 1885–'86, 18°.5, is 2°.2 below the mean for the past twenty-three winters.

Indiana.—Spiceland, Henry county: the mean temperature for the winter of 1885–'86, 26°.5, is 1°.6 below the mean of the past thirty-two winters.

Vevay, Switzerland county: the maximum temperature that has occurred in any February for the past twenty-one years was 75°.0, in 1885, and the minimum, —10°.0, in 1867.

Iowa.—Monticello, Jones county: the maximum temperature that has occurred in any February during the past thirty-two years was 60°, in 1877, and the minimum, —32°, in 1875; the mean temperature for the winter of 1885–'86, 17°.4, is 2°.5 below the average.

Kansas.—Yates Centre, Woodson county: the temperature for the winter of 1885–'86, 26°.4, is 0°.6 below the mean for the past six years.

Maryland.—Fallston, Harford county: the maximum temperature that has occurred in any February for the past fifteen years was 37°.8, in 1880, and the minimum, 23°.7, in 1875.

Massachusetts.—Worcester, Worcester county: the maximum temperature for February was 48°.0, and the minimum, —9°.0, the extremes in February for a period of forty-eight years being 70°, in 1878, and —11°.2, in 1855.

New York.—Palermo, Oswego county: the mean temperature for the winter months of 1885–'86 was 20°.2, or 1°.4 below the average for the past thirty-three years.

North Volney, Oswego county: the highest mean temperature that has occurred in any February for the past eighteen years was 28°.4, in 1882, and the lowest, 12°.4, in 1885; the mean temperature for the winter of 1885–'86 was 22°.1, the average for eighteen winters being 17°.8; the highest winter mean for the same period was 28°.7, in 1879–'80, and the lowest, 17°.8, in 1874–'75.

Ohio.—Wauseon, Fulton county: the highest February mean temperature for a period of sixteen years was 35°.4, in 1882, and the lowest, 11°.3, in 1875, the extremes during this time were 62°.7, in 1880, and —24°.3, in 1885; the mean temperature for the past winter was 24°.1, or 1°.0 below the normal; the warmest winter was that of 1879–'80, when the mean was 33°.0, and the coldest occurred in 1874–'75, the mean being 17°.2.

Pennsylvania.—Dyberry, Wayne county: the maximum temperature that has occurred in any February for the past twenty-seven years was 59°.0, in 1880, and minimum, —28.0, in 1868.

Texas.—New Ulm, Austin county: the highest February mean temperature for a period of fourteen years was 62°.1, in 1882, and the lowest, 52°.6, in 1883, the extremes during this period being 88°.0 and 16°.0, both in 1883; the mean temperature of the winter of 1885–'86 was 50°.7.

Virginia—Variety Mills, Nelson county: the highest February mean temperature for the past nine years was 43°.4, in 1884, and the lowest, 29°.6, in 1885; the minimum temperature for February, 1886, was —15°.6, being within 0°.4 of the lowest temperature recorded at this station during the past eleven years, viz., —16°.0, on December 31, 1880. The mean temperature for the winter of 1885–'86 was 32°.9, or 4°.0 below the average for nine years, and is the same as the lowest winter mean during that time, which occurred in 1880–'81; the highest winter mean was 43°.5, in 1879–'80.

Wytheville, Wythe county: the maximum temperature for February, 1886, 62°.0, is 1°.2 below the mean of the maximum temperatures for the past twenty-two years; the minimum for February, 1886, —7°.0, is 14°.8 below the mean of the minimum temperatures for the same period.

In the following table are given the mean temperatures for the several geographical districts, with the normals and departures, as deduced from Signal Service observations:

Average temperatures for February.

Districts.	Average for Feb. Signal-Service observations.		Comparison of Feb., 1886, with the average for several years.
	For several years.	For 1886.	
	°	°	°
New England	27.3	24.8	— 2.5
Middle Atlantic States	35.6	31.4	— 4.2
South Atlantic States	49.8	44.5	— 5.3
Florida Peninsula	63.2	57.7	— 5.5
Eastern Gulf States	52.6	47.2	— 5.4
Western Gulf States	52.2	49.4	— 2.8
Rio Grande Valley	62.1	61.5	— 0.6
Tennessee	43.8	37.8	— 6.0
Ohio Valley	35.6	30.6	— 5.0
Lower Lake region	27.0	24.6	— 2.4
Upper Lake region	20.0	18.7	— 1.3
Extreme Northwest	8.2	11.6	+ 3.4
Upper Mississippi Valley	28.0	26.0	— 2.0
Missouri Valley	22.5	24.0	+ 1.5
Northern slope	21.2	32.5	+11.3
Middle slope	30.5	36.8	+ 6.3
Southern slope	46.3	46.1	— 0.2
Southern plateau	45.6	48.3	+ 2.7
Middle plateau	33.5	40.0	+ 6.5
Northern plateau			
North Pacific coast region	40.9	44.5	+ 3.5
Middle Pacific coast region	49.2	53.5	+ 4.3
South Pacific coast region	55.8	60.2	+ 4.4

RANGES OF TEMPERATURE.

The monthly, and the greatest and least monthly ranges of temperature, are given in the tables of miscellaneous meteorological data.

The monthly ranges were greatest in the extreme northwest, northern slope, and upper Missouri valley, where they generally varied from 80° to 90°; they were least in Florida and along the Pacific coast.

The following are some of the greatest and least monthly ranges:

Greatest.		Least.	
	°		°
Yankton, Dakota	90.4	Tatoosh Island, Washington Territory	20.2
Moorhead, Minnesota	87.7	Fort Canby, Washington Territory	21.9
Fort Shaw, Montana	87.2	Pysht, Washington Territory	27.0
Huron, Dakota	86.7	Astoria, Oregon	27.0
Valentine, Nebraska	85.7	Key West, Florida	30.0
Saint Vincent, Minnesota	85.3	San Francisco, California	30.0
Omaha, Nebraska	83.7	Portland, Oregon	34.0
Fort Totten, Dakota	83.4	Sacramento, California	34.7

LOW TEMPERATURES

New Haven, Connecticut: the temperature fell to 7°.7 below zero on the 5th, being the lowest recorded this winter.

Saint Albans, Franklin, county, Vermont: at 7 a. m. of the 5th the temperature was 24° below zero; at Saint Albans Bay 28° below, and at East Berkshire, this county, it was reported 40° below.

Albany, New York: a minimum temperature of —10°.7 was recorded on the morning of the 5th, being the coldest this winter; owing to the extreme cold weather, ice-men were compelled to suspend work, and other out-door operations were greatly interrupted.

New York City: the minimum temperature, 1°.8 below zero, that occurred on the morning of the 5th was the lowest temperature recorded at this station since December 31, 1880; in more exposed parts of the city the temperature is said to have been 5° to 10° below zero. Much suffering was caused by the intense cold, and many persons were badly frost-bitten.

Saratoga, Saratoga county, New York: a cold wave swept over this place during the night of the 5th, the temperature falling to 36° below zero.

Philadelphia, Pennsylvania: the mean temperature for the 5th was 6°.0, the minimum being 2°.4 below zero, which was the coldest since the establishment of this station.

Shenandoah, Schuylkill county, Pennsylvania: the 5th was the coldest day ever experienced in this locality. The thermometer in the morning registered from 10° to 16° below zero. Work was suspended at several of the collieries owing to the intense cold, and the public schools were dismissed.

Baltimore, Maryland: the temperature fell to 1°.1 below zero on the 5th, being the lowest since January 1, 1881.

Washington City: the morning of the 5th was the coldest of the season, the minimum thermometer recording 2°.3 below zero.

Norfolk, Virginia: the temperature at 7 a. m. of the 5th was 3°.5, the lowest reading that has been recorded since the establishment of this station, and from other reports, the coldest experienced since 1857.

Bird's Nest, Northampton county: the temperature at 7 a. m. of the 5th was 2°.0, being 4°.0 lower than at any time during the past eighteen years.

Cape Henry, Virginia: the temperature fell rapidly during the night, and on the morning of the 5th reached a minimum of 5°.4, which was the lowest that has been observed for several years.

Chincoteague, Virginia: on the morning of the 5th the minimum thermometer recorded 2°.4, being the coldest experienced on this island since 1857.

Richmond, Henrico county, Virginia: the weather on the 4–5th was the coldest experienced since December 30, 1880, the thermometer recording from 4° to 8° below zero. Reports from other parts of the state showed a similar condition, the temperature in some cases ranging from 16° to 20° below zero.

Staunton, Augusta county, Virginia: at 6.30 a. m. of the 5th the thermometer registered 25° below zero, being the coldest weather ever experienced at this place.

Kitty Hawk, North Carolina: the lowest temperature that has been recorded since the establishment of this station occurred on the morning of the 5th, the thermometer registering 5°.4.

Buffalo, New York: the minimum thermometer recorded 12°.1 below zero on the morning of the 5th; it was the coldest day of the season.

Nashville, Tennessee: on the morning of the 5th a minimum temperature of —6°.6 was recorded, it being the lowest ever observed at this station in February. Mr. E. D. Hicks, who resides thirteen miles southwest of this city, reported a temperature of —13°.0, his thermometer being perfectly accurate.

Cedar Keys, Florida: on the morning of the 5th the temperature fell to 26°.5, which was very low for this season of the year in this state; ice formed one-quarter of an inch thick on the salt water bayous; some damage was reported to early vegetation.

Table of comparative maximum and minimum temperatures for February.

State or Territory.	Station.	For 1886.		Since establishment of station.			
		Max.	Min.	Max.	Year.	Min.	Year.
		°	°	°		°	
Alabama	Mobile	70.7	19.3	78.0	1883	27.6	1885
Do	Montgomery	73.0	14.4	81.2	1883	15.5	1885
Arizona	Prescott	70.4	18.6	80.0	1879	—11.0	1880
Do	Fort Apache	71.0	14.5	74.0	1881	— 9.0	1880
Arkansas	Fort Smith	69.0	1.9	78.4	1883	1.0	1885
Do	Little Rock	72.8	7.0	77.0	1882	10.0	1885
California	San Francisco	71.0	41.0	71.0	1884	35.0	1853, 1884
Do	San Diego	80.3	44.2	82.6	1883	35.0	1880
Colorado	Denver	71.0	2.9	72.0	1879	—21.0	1883
Do	Pike's Peak	36.6	—19.3	39.0	1876	—37.0	1875
Connecticut	New Haven	51.2	— 7.7	65.0	1880	— 3.0	1874
Do	New London	50.5	— 4.2	62.0	1880	— 6.0	1871
Dakota	Fort Buford	51.2	—20.0	57.0	1882	—40.0	1883, 1884
Do	Yankton	63.6	—24.8	68.0	1876	—23.1	1884
Delaware	Cape Henlopen	44.6	15.1	.....	.....	.....	.....
Do	Del. Breakwater	.....	.....	66.0	1880	7.0	1881
District of Columbia	Washington City	67.5	— 2.3	78.0	1874	— 1.5	1875
Florida	Jacksonville	72.6	24.3	83.0	1876, 1883	32.0	1875, 1878
Do	Key West	82.3	52.3	87.0	1874	55.0	'72, '77, '78
Georgia	Atlanta	65.3	8.4	74.5	1883	6.0	1885
Do	Savannah	70.3	19.0	80.0	'76, '80, '83	22.5	1885
Idaho	Boisé City	.....	.....	64.0	1879	— 8.5	1884
Do	Lewiston	.....	.....	63.0	1881	—17.5	1884
Illinois	Cairo	60.2	— 2.6	74.0	1883	— 0.6	1885
Do	Chicago	55.6	— 6.3	63.0	1876, 1880	—13.7	1885
Indiana	Indianapolis	54.5	— 4.2	72.0	1883	— 9.0	1885
Indian Territory	Fort Sill	75.0	5.0	79.0	1879, 1880	6.0	1885
Iowa	Dubuque	45.0	—21.2	67.2	1882	—31.0	1875
Do	Keokuk	56.3	—17.7	68.0	1876	—14.5	1885
Kansas	Dodge City	66.0	— 2.4	78.0	1876	—20.0	1883
Do	Leavenworth	61.5	—10.0	73.0	1876	—16.2	1885
Kentucky	Louisville	61.0	— 0.2	77.5	1883	— 1.3	1885
Louisiana	New Orleans	74.0	25.0	80.0	1883	30.0	1885
Do	Shreveport	77.2	19.8	80.5	1870	14.6	1885
Maine	Eastport	48.6	—14.0	47.0	1874, 1878	—20.0	1870
Do	Portland	51.5	—10.2	58.0	1880	— 7.0	1874, 1870
Maryland	Baltimore	66.9	— 1.1	78.0	1874	2.0	1873
Massachusetts	Boston	57.3	— 5.6	64.0	1880	— 6.5	1876
Michigan	Detroit	54.1	— 2.6	64.3	1884	—20.0	1875
Do	Marquette	50.5	—14.4	69.0	1877	—27.0	1875
Minnesota	Duluth	55.4	—25.0	57.0	1877	—32.3	1885
Do	Saint Paul	49.0	—28.1	59.0	1880	—32.0	1875
Mississippi	Vicksburg	74.9	16.0	83.1	1883	17.2	1885
Missouri	Saint Louis	63.6	— 7.9	73.3	1882	— 5.5	1885
Montana	Fort Benton	69.1	—11.0	62.0	1882	—41.0	1883
Do	Helena	62.1	—12.6	60.0	1881	—32.0	1883
Nebraska	North Platte	61.0	5.0	68.3	1882	—29.0	1883
Do	Omaha	64.3	—19.4	66.0	1880	—34.9	1883
Nevada	Winnemucca	67.3	11.0	69.0	1879	—17.0	1882
New Hampshire	Mount Washington	41.0	—39.2	43.0	1883	—43.0	1876
New Jersey	Atlantic City	50.3	— 2.3	71.0	1880	— 5.0	1875
Do	Sandy Hook	53.5	— 3.2	71.0	1874	— 1.5	1885
New Mexico	Santa Fé	56.0	9.0	75.0	1879	— 3.0	1879, 1880
New York	Buffalo	35.8	—12.1	63.8	1883	—13.0	1875
Do	New York City	35.8	— 1.8	69.0	1874	— 4.0	1873
North Carolina	Charlotte	68.0	5.9	76.5	1883	12.0	1885
Do	Wilmington	.....	.....	81.0	1884	15.0	1875
Ohio	Cincinnati	62.9	— 0.8	73.0	1883	9.6	1885
Do	Toledo	58.2	— 8.1	65.0	1883	—15.5	1885
Oregon	Portland	63.0	31.0	64.7	1882	7.0	1883
Do	Roseburg	72.1	30.9	68.7	1883	9.4	1883
Pennsylvania	Philadelphia	55.6	— 2.4	75.0	1874	— 1.0	1875, 1881
Do	Pittsburg	62.7	— 3.0	76.5	1882	—10.0	1875
Rhode Island	Block Island	52.0	— 1.0	.....	.....	.....	.....
Do	Newport	.....	.....	56.0	1880	— 2.0	1881
South Carolina	Charleston	72.3	13.3	78.0	1876, 1880, 1882, 1883	22.0	1885
Tennessee	Knoxville	66.0	— 4.1	79.0	1871	1.0	1885
Do	Nashville	61.5	— 6.6	77.4	1883	— 0.8	1885
Texas	Fort Davis	76.3	18.0	79.0	1879	9.0	1883
Do	Galveston	71.0	—31.6	75.0	1882, 1884	28.0	1885
Utah	Salt Lake City	63.2	19.8	68.0	1879	0.0	1883
Virginia	Lynchburg	65.2	1.3	75.0	1874	3.0	1875
Do	Norfolk	70.8	3.5	81.0	1871	9.0	1875
Washington Ter.	Dayton	.....	.....	60.0	1885	—24.0	1883
Do	Olympia	61.0	25.8	59.1	1884	2.0	1884
Wisconsin	La Crosse	52.0	—28.0	65.0	1882	—34.0	1875
Do	Milwaukee	43.9	—15.6	60.0	1882	—23.6	1885
Wyoming	Cheyenne	63.2	9.2	59.0	'79, '80, '81	—28.2	1884

FROSTS.

Frosts occurred in the various districts on the following dates:

New England.—1st to 28th.

Middle Atlantic states.—1st to 28th.

South Atlantic states.—1st to 10th, 13th to 28th.

Florida.—Sanford, 6th, 14th; Cedar Keys, 5th, 6th; Archer, 2d, 6th to 9th, 13th, 14th; Limona, 5th, 6th, 13th.

East Gulf states.—1st, 2d, 4th to 8th, 12th, 13th, 16th, 17th, 18th, 20th to 23d, 26th.

West Gulf states.—1st to 5th, 7th, 8th, 10th to 13th, 16th, 17th, 18th, 20th, 21st, 22d, 26th.

Tennessee.—1st to 9th, 13th, 15th to 22d, 24th, 26th, 27th.

Ohio Valley.—1st to 11th, 13th to 28th.

Lower lake region.—1st to 28th.

Upper lake region.—1st to 28th.

Extreme northwest.—1st to 28th.

Upper Mississippi valley.—1st to 28th.

Missouri Valley.—1st to 28th.

Northern slope.—1st to 28th.

Middle slope.—1st to 28th.

Southern slope.—1st to 8th, 10th, 11th, 12th, 14th to 28th.

Southern plateau.—1st to 21st, 23d, 25th.

Middle plateau.—1st to 28th.

Northern plateau.—3d, 4th, 6th to 9th, 13th to 21st, 24th, 26th, 27th, 28th.

North Pacific coast region.—1st, 7th, 8th, 14th, 17th to 22d, 24th to 28th.

Middle Pacific coast region.—1st to 22d, 27th, 28th.

South Pacific coast region.—Murietta, California, 5th.

ICE.

Ice formed in the southern part of the country, as follows:

Alabama.—Greensborough, 4th, 5th, 6th, 16th, 20th; Birmingham, 4th, 5th, 6th.

Arkansas.—Little Rock, 3d to 6th, 15th, 17th, 20th.

Florida.—Cedar Keys, 5th; Pensacola, 4th, 5th.

Georgia.—Athens, 1st to 8th, 16th to 21st, 27th; Quitman, 5th, 6th, ice formed on eleven nights, and as late as the 27th.

Louisiana.—New Orleans, 4th, 5th, 6th.

North Carolina.—Fort Macon, 4th, 5th, 6th; Hatteras, 6th; Wash Woods, 3d; Kitty Hawk, 5th.

Texas.—Galveston, 4th.

PRECIPITATION.

[*Expressed in inches and hundredths.*]

In the following table are shown, for the several geographical districts, the normal February precipitation for a series of years; the average for February, 1886, and the excess or deficiency as compared with the normal:

Average precipitation for February.

Districts.	Average for February, Signal-Service observations.		Comparison of Feb., 1886, with the average for several years.
	For several years.	For 1886.	
	Inches.	*Inches.*	*Inches.*
New England	4.07	7.48	+3.41
Middle Atlantic States	3.70	4.76	+1.06
South Atlantic States	3.98	2.35	—1.63
Florida Peninsula	3.00	1.09	—1.91
Eastern Gulf States	4.94	2.88	—2.06
Western Gulf States	4.21	3.45	—0.76
Rio Grande Valley	1.42	2.02	+0.60
Tennessee	5.24	4.04	—1.20
Ohio Valley	3.84	1.72	—2.12
Lower lake region	2.62	2.14	—0.48
Upper lake region	2.07	1.87	—0.20
Extreme northwest	0.75	0.82	+0.07
Upper Mississippi Valley	2.30	1.33	—0.97
Missouri Valley	0.90	0.42	—0.48
Northern slope	0.58	0.88	+0.30
Middle slope	0.57	0.75	+0.18
Southern slope	0.93	0.37	—0.56
Southern plateau	1.34	1.20	—0.14
Middle plateau	1.20	0.88	—0.32
North Pacific coast region	7.12	3.60	—3.52
Middle Pacific coast region	3.35	0.52	—2.83
South Pacific coast region	2.26	1.00	—1.26

The distribution of rainfall over the United States and Canada for February, 1886, as determined from reports from more than seven hundred stations, is exhibited on chart iii.

The precipitation for the month was below the normal in all districts, except in the northern slope, portions of the middle slope and the southern plateau, the Rio Grande Valley, and on the Atlantic coast north of Virginia, where it was above the normal. The excess in the districts named was slight, except on the New England and middle Atlantic coasts, where the departures were marked, especially from northern New Jersey to southern Maine. At Block Island, Rhode Island, the rainfall amounted to 14.05, and at New London, Connecticut, it was 11.98, the latter being the largest amount recorded in February since the establishment of that station, in 1871.

From the south Atlantic and Gulf states northward to British America, and in the districts on the Pacific coast, the precipitation for February, 1886, was below the normal. The deficiencies were decided on the Pacific coast and in the states south of the Ohio and east of the Mississippi rivers. In the middle Pacific coast region only about one-sixth of the average amount of rain fell; and in the north Pacific coast region about one-half of the average amount fell.

The following are some of the most marked departures from normal precipitation at Signal Service stations:

Above normal.		Below normal.	
	Inches.		*Inches.*
New London, Connecticut	8.32	Olympia, Washington Territory	6.09
Block Island, Rhode Island	8.14	Atlanta, Georgia	4.20
Boston, Massachusetts	3.40	Red Bluff, California	3.88
Sandy Hook, New Jersey	2.93	San Francisco, California	3.64
New York City	2.35	Fort Smith, Arkansas	3.63
Portland, Maine	2.26	Little Rock, Arkansas	3.35
Baltimore, Maryland	2.12	Sacramento, California	3.12

SNOW.

Snow fell in the various districts during the month, as follows:

New England.—1st to 4th, 6th, 7th, 9th, 11th to 28th.

Middle Atlantic states.—1st to 7th, 11th, 12th, 13th, 15th, 16th, 19th to 28th.

South Atlantic states.—2d, 3d, 4th, 11th, 27th, 28th.

East Gulf states.—Atlanta, 27th.

West Gulf states.—Fort Smith, Arkansas, 1st, 2d; Palestine, Texas, 2d; Little Rock, Arkansas, 2d, 3d.

Tennessee.—1st to 4th, 6th, 8th, 12th to 15th, 27th.

Ohio Valley.—1st to 9th, 12th to 28th.

Lower lake region.—1st to 8th, 12th to 28th.

Upper lake region.—1st to 6th, 10th, 11th, 13th to 28th.

Extreme northwest.—1st, 2d, 3d, 8th, 18th, 20th, 22d, 24th to 28th.

Upper Mississippi valley.—1st to 4th, 9th to 21st, 24th, 25th, 27th, 28th.

Missouri Valley.—1st, 2d, 3d, 9th, 10th, 13th to 18th, 21st, 24th, 26th, 27th, 28th.

Northern slope.—1st to 4th, 6th, 9th, 10th, 12th to 19th, 23d, 24th, 26th, 27th, 28th.

Middle slope.—1st, 2d, 3d, 8th, 9th, 10th, 13th to 16th, 24th to 28th.

Southern slope.—Puerto de Luna, New Mexico, 1st, 26th; Fort Sill, Indian Territory, 2d; Abilene, Texas, 3d; Fort Wingate, New Mexico, 25th to 28th; Fort Bayard, New Mexico, 26th, 27th.

Southern plateau.—Santa Fé, New Mexico, 1st, 2d, 27th; Prescott, Arizona, 27th, 28th.

Middle plateau.—1st, 2d, 8th, 9th, 10th, 14th, 15th, 26th, 27th, 28th.

Northern plateau.—2d, 8th, 9th, 12th, 13th, 26th, 27th, 28th.

North Pacific coast region.—Pysht, Washington Territory, 13th.

Snow storms of unusual severity were reported, as follows:

Lead Hill, Boone county, Arkansas: seventeen inches of snow fell on the 3d, which is the heaviest snowfall since the winter of 1855–'56; all work and travel were completely suspended.

Lake City, Hinsdale county, Colorado: the worst snow storm ever experienced in this vicinity occurred on the 1st–2d; the roof of the Lake City Armory caved in from the weight of snow, causing considerable loss; miners were compelled to leave the mines, for fear of snow slides.

Memphis, Tennessee: the heavy snow of the 2–3d caused a general suspension of business; trains and mails were delayed, and street cars, drays, etc., were unable to move.

Cairo, Illinois: the heavy snow storm of the 2d caused the blockade of all the railroads running into this city.

Washington City: the heaviest snow storm for several years occurred on the 3d–4th.

Baltimore, Maryland: the heaviest snow storm for several years occurred on the 3–4th; the ground was covered to the depth of fifteen inches, causing considerable delay to all kinds of traffic.

Philadelphia, Pennsylvania: an unusually heavy snow storm occurred on the 3d; streets were almost impassable, and travel on many of the horse-car lines was suspended.

Vineland, Cumberland county, New Jersey: the severest snow storm for five years occurred on the 4th; railroads were blockaded and travel on the highways was rendered difficult.

Dennisport, Barnstable county, Massachusetts: the heaviest fall of snow known for a number of years occurred from the 3d to 5th; the snow was six feet deep in some places, and badly drifted; roads were almost impassable, and trains and mails greatly delayed.

Jackson, Hinds county, Mississippi: a heavy snow storm occurred on the 2–3d, which extended south as far as Grenada, Mississippi; all trains on the Illinois Central Railway were delayed, and communication with the north greatly interrupted.

The following is from the New York "Herald" of February 5, 1886:

PARSONS, KANSAS, *February* 4.—The late fall of snow was much the heaviest ever known in this country. In Indian Territory it is said to be much heavier than here, having fallen there to the depth of two feet on a level. Passenger trains from the South have been badly delayed. Reports from western Kansas indicate great suffering and heavy losses. The farmers in this vicinity have experienced considerable loss of stock, principally hogs and sheep. Wagon roads are completely blockaded.

Buffalo, New York: the heavy snow storm of the 15th greatly delayed railroad traffic.

Augusta, Kennebec county, Maine: the heavy snow storm from the 25th to 27th caused the blockade of railroads; drifts from three to ten feet deep obstructed the highways; traffic and travel were greatly interfered with.

Bath, Sagadahoc county, Maine: the severe northeast snow storm of the 26–27th blockaded all railroads leading into the city.

Waterville, Kennebec county, Maine: the worst drifting snow storm in this part of the country for the past twenty-five years occurred on the 27th.

Bangor, Penobscot county, Maine: from eighteen to twenty-four inches of snow fell on the 26–27th; streets outside of the centre of the city were impassable, and railroad trains were blockaded.

Richmond, Sagadahoc county, Maine: the worst snow storm for years occurred from the 25th to 27th; a heavy gale prevailed which caused the snow to drift badly, filling cuts, blockading trains, and greatly interfering with traffic.

Winthrop, Kennebec county, Maine: a heavy snow storm began on the morning of the 25th and continued throughout the 26th and 27th; the high wind piled the snow in huge drifts, impeding travel.

Portland, Maine: a northwest gale, with heavy snow, occurred on the 26–27th; reports from surrounding towns state that it was the worst storm that has been experienced for years; trains were blockaded and several accidents occurred.

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows, for certain stations, as reported by voluntary observers, the average precipitation for the month of February for a series of years; the precipitation for February, 1886; and the departures from the average:

Station.	County.	Average precipitation for Feb.	Number of years.	Precipitation for February, 1886.	Departure.
Arkansas.		*Inches.*		*Inches.*	*Inches.*
Lead Hill	Boone	7.39	4	2.61	− 4.78
California.					
Sacramento	Sacramento	2.70	12	0.35	− 2.35
Connecticut.					
Hartford	Hartford	3.58	14	6.16	+ 2.58
Middletown *	Middlesex	4.03	28	7.43	+ 3.40
Wallingford *	New Haven	4.25	28	8.77	+ 4.52
Dakota.					
Webster	Day	3.21	3	1.93	− 1.28
Illinois.					
Anna	Union	3.92	11	2.38	− 1.54
Mattoon	Coles	3.94	6	0.25	− 3.69
Peoria	Peoria	2.04	30	1.86	− 0.18
Riley	McHenry	1.66	23	1.61	− 0.05
Swanwick	Perry	5.16	4	1.31	− 3.85
Sycamore	De Kalb	2.64	4	1.85	− 0.79
Indiana.					
Lafayette	Tippecanoe	4.12	7	1.32	− 2.80
Mauzy	Rush	4.46	6	1.14	− 3.32
Spiceland	Henry	2.91	26	1.01	− 1.90
Vevay	Switzerland	2.93	21	1.51	− 0.42
Iowa.					
Cresco	Howard	0.95	10	0.95	0.00
Monticello	Jones	1.89	32	1.31	− 0.58
Kansas.					
Independence	Montgomery	2.22	14	1.48	− 0.74
Wellington	Sumner	1.11	8	1.08	− 0.03
Yates Centre	Woodson	2.09	6	1.62	− 0.47
Maine.					
Gardiner	Kennebec	3.55	48	7.25	+ 3.70
Orono *	Penobscot	3.88	18	5.42	+ 1.54
Maryland.					
Fallston	Harford	3.87	15	5.96	+ 2.09
Massachusetts.					
Amherst *	Hampshire	3.12	51	4.36	+ 1.24
Cambridge *	Middlesex	3.57	45	7.82	+ 4.25
Chestnut Hill *	Middlesex	4.43	11	7.89	+ 3.46
Framingham *	Middlesex	4.06	12	6.28	+ 2.22
Lake Cochituate *	Middlesex	3.60	35	6.86	+ 3.26
Lowell *	Middlesex	2.88	60	6.26	+ 3.38
Lynn *	Essex	3.65	12	7.47	+ 3.82
Mystic Lake *	Middlesex	4.12	11	7.20	+ 3.08
New Bedford *	Bristol	3.80	73	7.05	+ 3.25
Somerset	Bristol	3.63	16	8.70	+ 5.07
Springfield *	Hampden	3.49	39	4.80	+ 1.31
Waltham *	Middlesex	2.67	57	7.84	+ 5.17
Williamstown *	Berkshire	2.50	21	2.61	+ 0.11
Worcester	Worcester	3.21	45	6.32	+ 3.11
New Brunswick.					
Saint John *	Saint John	4.70	26	6.08	+ 1.38
New Hampshire.					
Concord *	Merrimac	2.55	31	4.27	+ 1.72
Hanover *	Grafton	1.87	20	1.24	− 0.63
Nevada					
Carson City	Ormsby	1.17	7	0.28	− 0.89
New York.					
Factoryville	Tioga	1.90	4	0.94	− 0.96
Palermo	Oswego	2.23	33	2.36	+ 0.11
Plattsburg Barracks	Clinton	1.52	17	1.22	− 0.30
North Volney	Oswego	2.69	14	2.25	− 0.44
Ohio.					
Wauseon	Fulton	2.93	13	0.84	− 2.09
Pennsylvania.					
Dyberry	Wayne	2.74	17	2.43	− 0.31
Rhode Island.					
Providence *	Providence	3.67	55	11.31	+ 7.64
South Carolina.					
Kirkwood	Kershaw	3.56	20	1.59	− 1.97
Statesburg	Sumpter	2.27	5	1.46	− 0.81
Texas.					
New Ulm	Austin	4.71	14	1.65	− 3.06
Vermont.					
Lunenburg *	Essex	2.89	38	1.67	− 1.22
Newport *	Orleans	2.73	11	3.23	+ 0.50
Strafford *	Orange	2.70	11	2.70	0.00
Virginia.					
Bird's Nest	Northampton	3.61	18	5.00	+ 1.39
Dale Enterprise	Rockingham	3.45	6	3.59	+ 0.14
Variety Mills	Nelson	3.54	7	4.02	+ 0.48
Wytheville	Wythe	3.33	21	1.53	− 1.80
West Virginia.					
Helvetia	Randolph	4.36	10	2.71	− 1.65

* From the "Bulletin of the New England Meteorological Society."

The following notes in connection with this subject are reported by voluntary observers:

Arkansas.—Lead Hill, Boone county: the total precipitation for the winter of 1885–'86, 7.36, is 8.09 below the average for the past four years.

Connecticut.—Hartford, Hartford county: the rainfall of the 11–13th amounted to 4.32, and was the heaviest precipitation in the past fourteen years.

Illinois.—Riley, McHenry county: the total precipitation for the winter months of 1885–'86, 7.58, is 2.08 above the average for the past twenty-two winters.

Indiana.—Vevay, Switzerland county: the greatest precipitation that has occurred in any February for a period of twenty-one years was 10.23, in 1884, and the least, 0.40, in 1877. The total snowfall for February, 1886, 6.06, is 2.23 above the average; the greatest monthly snowfall in any one February that has occurred during the above period was 11.75, in 1867; no snow fell during February in 1877 and 1878.

Iowa.—Monticello, Jones county: the greatest monthly precipitation that has occurred in any February during a period of thirty-two years was 4.22, in 1857, and the least, 0.32, in 1877. The greatest February snowfall that occurred during this time was 15.80, in 1874, and the least, 0.25, in 1869, the normal being 7.84.

Kansas.—Yates Centre, Woodson county: the total precipitation for the winter months of 1885–'86, 4.34, is 0.26 below the average for the past six years.

Maine.—Cornish, York county: the total snowfall for February was 22.0; the largest February snowfall for a period of twenty-nine years, 42.0, occurred in 1882, and the least, 5.0, in 1875.

Maryland.—Fallston, Harford county: the greatest monthly precipitation for February for a period of fifteen years was 7.01, in 1884, and the least, 1.50, in 1872.

Massachusetts.—Worcester, Worcester county: the precipitation for February, 1886, was far above the mean; the total rainfall, including melted snow, was 6.32 against 3.49 during the same period last year, while the average for the forty-five preceding years is but 3.21. The snowfall during the month was 5.50 against 11.12 during the same period in 1884, while the mean for the forty-five preceding years is 11.91. The aggregate snowfall this winter was 36.83.

New York.—Palermo, Oswego county: the total snowfall for February, 1886, was 4.75, or 17.75 below the average for the thirty-three years; the greatest February snowfall that has occurred in this period was 61.0, in 1856, and the the least, 1.0, in 1877; the snowfall for the winter months of 1885–'86, 43.0, is 18.0 below the average for the same number of years.

North Volney, Oswego county: the greatest monthly precipitation in any February for a period of fourteen years was 4.70, in 1876, and the least, 0.30, in 1877. The precipitation for the winter months of 1885–'86, 10.35, is 1.00 above the average; the greatest winter precipitation for this period was 13.95, in 1878–'79, and the least, 5.95, in 1876–'77.

Ohio.—Wauseon, Fulton county: the greatest monthly precipitation for February that has occurred in a period of twelve years was 6.81, in 1876, and the least, 0.12, in 1877. The snowfall for February, 1886, is just one-half the average.

Texas.—New Ulm, Austin county: the greatest precipitation that has occurred in any February during the past fourteen years was 10.94, in 1882, and the least, 1.06, in 1885.

Virginia.—Variety Mills, Nelson county: the greatest monthly precipitation that has occurred in February during the past seven years was 7.12, in 1884, and the least, 1.75, in 1879.

LARGEST MONTHLY SNOWFALLS.

[*Expressed in inches and tenths.*]

Monthly snowfalls of five inches or more were reported from the various states and territories during the month, as follows:

Arkansas.—Lead Hill, 17; Fort Smith, 8.

California.—Cisco, 23; Blue Lake, 19; Emigrant Gap, 16; Summit, 14; Boca, 7; Tacoma, 6; Towels and Truckee, 5.

Connecticut.—New London, 12.4; North Colebrook, 8.3; Bethel and Wallingford, 6.

Colorado.—Pike's Peak, 7.6; Denver, 7.4.

Dakota.—Richardton, 22; Deadwood, 18.8; Fort Buford, 11.9; Fort Totten, 8.8; Webster, 7.9; Vermillion and Bismarck, 5.5; Yankton, 5.3.

District of Columbia.—Kendall Green, 14; Washington City, 12.5.

Illinois.—Waukegan, 12; Chicago, 7.5; Anna, 7.1; Makanda and Cedarville, 7; Rockford, 6.6; Riley, Geneseo, and Marengo, 6.5; Prairieville, Payson, and Elizabethtown, 6; Sycamore, 5.5.

Indiana.—Laconia, 13; Jeffersonville, 9.5; Princeton, 9; Marengo, 8.6; Connersville, 8.5; Sunman, Columbus, and Butlerville, 8; Blue Lick, 7.8; Guilford, 7.7; Mauzy, 7.1; Degonia, 7; Richmond and Knightstown, 6.5; Vevay, 6.1; Brookville, 6; Spiceland, 5.6; Greencastle, 5.1.

Iowa.—Manchester, 10; Cresco and Dubuque, 9; Independence, 8; West Union, 7.6; Monticello, 6.3; Cedar Rapids, Muscatine, and Clinton, 6; Oskaloosa, 5.2.

Kansas.—Ninnescah, 14.5; Wellington and Elk Falls, 10; Independence, 9; Concordia, 7.5; Yates Centre and El Dorado, 5.

Kentucky.—Richmond, 14.1; Frankfort, 10.3; Louisville, 7.3.

Maine.—Kent's Hill, 36; Cornish, 35; Orono, 32; Buckfield and Bridgeton, 28; Solan, 27.1; Belfast and Gardiner, 19; Mayfield, 16; Portland, 11.2; Eastport, 5.9.

Maryland.—Baltimore, 15.3; Woodstock, 15; Fallston, 14.8; Cumberland, 5.

Massachusetts.—New Bedford, 14; Fall River, 12; Somerset, 11.2; Provincetown, 11.1; Nantucket, Beverly Farms, and Cotuit, 10; Williamstown *a*, 9; Taunton *b*, 8.9; Rowe, South Hingham, and Williamstown *b*, 8; Fitchburg, 7.8; Taunton *a*, 7.5; Springfield, 6.2; Blue Hill Observatory, 6; Gilbertville, 5.8; Worcester, 5.6; Newburyport and Northfield, 5.5; Princeton and Chicopee, 5.

Michigan.—Pentwater, 19; Mackinaw City, 18.7; Traverse City, 16.5; Grand Haven, 14.3; Thornville, 14; Escanaba, 11.3; Kalamazoo, 11.2; Northport, 10; Alpena, 9.6; Marquette, 7.8; Hudson, 6.3; Lansing and Mottville, 5.

Minnesota.—Duluth, 20.2; Northfield, 9.8; Mankato, 8.8; Saint Vincent, 7.1; Bird Island, 6.8; Moorhead, 6.6; Red Wing, 6.5; Grand Forks, 6.2; Minneapolis, 5.5.

Missouri.—Pierce City, 15; Springfield, 14; Lamar, 11.6; Centreville, 6.6.

Montana.—Fort Custer, 21; Fort Maginnis, 14.6; Fort Shaw, 11.5; Fort Assinaboine, 6.4.

Nebraska.—Hay Springs, 10.8; Genoa, 7.5; Yutan, 6.5; Valentine, 6.3; Fairbury and North Platte, 6; Brownville, 5.5.

New Brunswick.—Parker's Ridge, 33; Saint John, 22.8.

New Hampshire.—Berlin Mills, 26; Grafton, 22; Littleton, 15.5; Mount Washington, 11.2; Walpole, 9.5; Hanover, 7.8; Warner, 7.

New Jersey.—Clayton and Sandy Hook, 18; Vineland, 16.5; Moorestown, 14.2; Beverly, 12.7; Princeton, 6.5; Atlantic City, 6.1; Dover, 5.5; Paterson, 5.2; South Orange, 5.

New Mexico.—Santa Fé, 6.

New York.—Buffalo, 34.3; Rochester, 16; Le Roy, 12.1; Humphrey, 11.5; Auburn, 10; White Plains and Brooklyn, 5.5.

Ohio.—Garrettsville, 13.5; Yellow Springs, 13.3; Cleveland *a*, 10.7; Jacksonborough, 10.5; Westerville, 10.2; College Hill, 8.5; Fostoria, 8.2; Toledo, 7.9; North Lewisburg, 7; Tiffin, 6.5; Cincinnati *a*, 6.4; Ruggles and West Milton, 6; Cincinnati *b*, 5.8; Cleveland *b*, 5.1.

Pennsylvania.—Zionsville, 15; Erie, 12.6; West Chester, 12.5; Germantown, 12; Philadelphia, 9.8; Fallsington, 9.1; Dyberry, 9; Easton, 6.2; Troy and Quakertown, 6; Grampian Hills and Blooming Grove, 5.

Rhode Island.—Block Island, 14; Narragansett Pier, 10; Providence *a*, 8; Pawtucket, 6.9; Olneyville, 6.8; Lonsdale, 6; Providence *b*, 5.

Tennessee.—Austin, 21; Paris, 20.8; Milan, 20; Nashville, 17.9; Memphis, 9.6; Knoxville, 6.4.

Vermont.—Newport, 22; Marlborough, 16.8; Strafford, 15; Chelsea, 13.5; Lunenburg, 13.2; Jacksonville, 12.5; Dorset, 12.2; Burlington and Post Mills, 11; Townshend, 10.7; Charlotte, 10.5; Windsor, 9.9; Brattleborough, 9.5; Vernon, 8.8; Poultney, 6.

Virginia.—Dale Enterprise, 18; Chincoteague, 17.3; Accotink and University of Virginia, 15; Bruington, 14; Variety Mills, 13.5; Lynchburg, 12; Marion, 10; Wytheville, 7 to 8; Bird's Nest, 6.9.

West Virginia.—Helvetia, 19.8.

Wisconsin.—Milwaukee, 15.3; Madison, 9; Prairie du Chien, 8.2; La Crosse, 7.5; Embarras, 7.2.

Wyoming.—Fort Bridger, 5.6.

DEPTH OF UNMELTED SNOW ON GROUND AT END OF MONTH.

[*Expressed in inches and tenths.*]

California.—Blue Lick, 8.

Connecticut.—North Colebrook, 4; Bethel, trace.

Colorado.—Pike's Peak, 10; Denver, 3.

Dakota.—Richardton, 12; Fort Buford, 4.9; Fort Totten, 4.2; Webster, 3.2; Bismarck, 2.2; Deadwood, 2.0; Vermillion, 1.2; Huron, 1; Yankton, 0.6.

Illinois.—Cairo, 11.7; Riley, 4.8; Sycamore, 4; Chicago, 3; Springfield, 2; Bloomington, 1.2; Windsor, trace.

Indiana.—Spiceland and Greencastle, 0.2; Jeffersonville and Sunman, trace.

Iowa.—Cresco, 8 to 48; West Union, 8 to 10; Monticello and Manchester, 8; Independence, 7.5; Dubuque, 6.3; Clinton and Muscatine, 6; Bancroft, 5; Cedar Rapids and Fort Madison, 4.5; Des Moines *a*, 4.1; Davenport, Des Moines *b*, and Oskaloosa *b*, 3; Oskaloosa *a*, 2.5.

Kansas.—Wyandotte and Concordia, 0.5; Leavenworth, 0.3; Allison, trace.

Maine.—Orono, 36; Buckfield, 30; Gardiner, 24; Portland, 5; Eastport, 4; Bar Harbor, 2.

Massachusetts.—Williamstown and Princeton, 5; Milton, New Bedford, Somerset, and Westborough 3; Fall River and Blue Hill Observatory, 2; Amherst and Boston, 1; Mendon and Taunton, 0.5.

Michigan.—Traverse City, 24; Marquette, 14; Mackinaw City and Grand Haven, 9; Pentwater, 5; Alpena, 4; Escanaba, 1.6; Thornville, drifts.

Minnesota.—Duluth, 14; Saint Vincent, 8.5; Minneapolis, 6; Moorhead 5; Saint Paul, 3.

Missouri.—Conception, 1.

Montana.—Fort Shaw, 8; Fort Assinaboine, 5.3; Fort Custer, 4; Fort Benton, 3.7; Helena, 3; Fort Maginnis, 2.

Nebraska.—Yutan, 5.5; Crete, Genoa, and Brownville, 4; De Soto, 3; Omaha and Fairbury, 2; Fremont, 1.8; Valentine, 1.6; Hay Springs and Stockham, 1.5; Marquette, 0.5.

New Hampshire.—Nashua and Mount Washington, 2.

New York.—North Volney and Buffalo, 6; Cooperstown and Humphrey, 3; Palermo and Auburn, 2; Rochester, 1; Albany, 0.5; Factoryville, trace.

Ohio.—Cleveland, 5.1; Napoleon, 0.5; Toledo, 0.2; Cincinnati, 0.1; Westerville, Wauseon, Garrettsville, Hiram, Tiffin, and Fostoria, trace.

Pennsylvania.—Dyberry, 3; Erie, 0.5; Blooming Grove, trace.

Texas.—Fort Elliott, 0.9.

Vermont.—Strafford, 16; Newport, 15; Brattleborough, 12; Dorset, 8.2; Lunenburg, 8; Poultney, 6; Charlotte, 5 to 6; Post Mills and Burlington, 5.

Virginia.—Wytheville, drifts; Dale Enterprise, trace.

Wisconsin.—Neillsville, 20; Embarras, 14; La Crosse, 10; Prairie du Chien, 8; Madison, 6.5; Milwaukee, 4; Evansville, 2.

SNOW FROM A CLOUDLESS SKY.

Philadelphia, Pennsylvania: snow fell on the 6th while the sky was clear of clouds for a distance of 35° from the zenith, and stars shining brightly.

Nashville, Tennessee: light rain and snow occurred from 9.56 to 10.15 p. m. of the 6th, from an almost cloudless sky; but .4 nimbus clouds were observed, which were fully 14° east of the zenith.

Yates Centre, Woodson county, Kansas: between 6.30 and 9.30 p. m. of the 3d a light fall of snow occurred, amounting to one-tenth of an inch in depth, the sky being free from clouds.

The observer at Yellow Springs, Greene county, Ohio, reports that snow fell from a cloudless sky on the 3d and 4th.

HAIL.

Los Angeles, California: a severe hail storm occurred from 3.13 to 3.17 p. m. and also for a few moments at 4 p. m. of the 28th; the hail-stones were about the size of peas and fell with considerable force, covering exposed places to the depth of half an inch or more, and which in some places remained unmelted until late in the afternoon; the storm was not accompanied by lightning or thunder.

Hail storms were also reported from the following states and territories:

Arizona.—Prescott, 22d, 23d.

Arkansas.—Mount Ida, 2d, 3d.

California.—Sacramento, Blue Lake, Los Angeles, and San Diego, 28th; San Francisco, 27th, 28th.

Connecticut.—North Colebrook, 19th.
Illinois.—Philo, 6th.
Kansas.—Leavenworth, 24th.
Louisiana.—Grand Coteau, 9th.
Maine.—Cornish, 11th, 12th.
Michigan.—Escanaba and Marquette, 24th.
Nebraska.—North Platte, 13th.
New Jersey.—Dover, 25th.
New Mexico.—Fort Wingate, 1st, 16th; Lava, 23d, 26th.
New York.—Factoryville, 25th.
North Carolina.—Weldon, 3d; Raleigh, 3d, 4th.
Oregon.—Astoria, 12th.
Pennsylvania.—Grampian Hills, 25th.
Tennessee.—Ashwood, 3d, 27th; Parksville, 3d; Covington, 26th.
Texas.—Silver Falls, 1st, 26th; Palestine, 10th.
Utah.—Salt Lake City, 8th.
Vermont.—Brattleborough, 11th, 25th.
Virginia.—Bird's Nest, 3d.
Washington Territory.—Tatoosh Island, 13th.

SLEET.

Sleet occurred in the various states and territories during the month, as follows:

Arkansas.—Little Rock, 2d; Fort Smith, 2d, 10th.
Dakota.—Fort Buford, 16th, 18th; Fort Yates, 17th; Webster, 18th; Fort Totten, 20th.
District of Columbia.—Washington City, 25th.
Florida.—Pensacola, 17th.
Georgia.—Athens, 27th.
Illinois.—Springfield, 12th.
Indiana.—La Grange, 6th.
Iowa.—Oskaloosa *a*, 10th; Oskaloosa *b* and Cedar Rapids, 11th; Fort Madison and Keokuk, 12th.
Kansas.—Fort Riley, 10th.
Maine.—Portland, 11th, 12th, 25th, 26th; Kent's Hill, 12th; Bar Harbor, 12th, 26th; Eastport, 26th.
Massachusetts.—Deerfield, 11th; Princeton, 12th.
Michigan.—Escanaba, Mackinaw City, and Marquette, 24th.
Minnesota.—Saint Paul, 9th; Moorhead, 20th.
Missouri.—Saint Louis, 11th, 12th.
Nebraska.—Omaha, 9th; Marquette, 10th.
New Hampshire.—Mount Washington, 13th, 14th.
New Jersey.—Phillipsburg, 25th.
New York.—Albany, 25th, 26th.
North Carolina.—Charlotte, 3d, 4th; Wilmington, 4th, 28th; Smithville, 28th.
Ohio.—Wauseon, 19th.
South Carolina.—Spartanburg, 2d; Aiken and Charleston, 27th.
Tennessee.—Bolivar and Grief, 2d; Parksville, 3d; Chattanooga, 2d, 3d; Memphis and Woodstock, 2d, 27th; Nashville and Rogersville, 15th; Milan and Hohenwald, 27th; Andersonville, 28th; Covington, 26th.
Virginia.—Norfolk, 3d.
Washington Territory.—Walla Walla, 1st.
Wisconsin.—Milwaukee, 26th.

Little Rock, Arkansas: the severest sleet storm in several years occurred on the 2d, all exposed surfaces were heavily coated with ice.

Nashua, Hillsborough county, New Hampshire: the storm of rain and sleet that occurred on the 12–13th was the most destructive in years; trees were loaded with ice, and many of the finest shade trees in the city were shorn of their largest limbs; the damage to fruit trees and shrubbery was also very great.

Worcester, Worcester county, Massachusetts: a destructive ice storm occurred on the 11th, doing great damage to shade and fruit trees, telegraph and telephone wires.

South Framingham, Middlesex county, Massachusetts: reports from Worcester county state that a severe ice storm occurred on the 12th, doing great damage to trees and shrubbery; in Lancaster (a town noted for its elm trees) many of the finest trees were ruined; in Clinton the streets were blockaded with fallen branches, and at Marlborough, Middlesex county, great damage was done to orchards; in Leominster, Sterling, Harvard, and at other points along the line of the Worcester, Nashua and Rochester Railroad, the destruction of small fruit trees was very great and the financial loss can not be estimated.

Table of excessive and greatest monthly precipitation for February, 1886.

Station.	Specially heavy.		Largest monthly.
	Date.	Amt.	Amount.
Alabama.			
Oswiches	27	2.54	
Prattville	27	2.12	
Montgomery	27, 28	2.12	
Newton	27	2.00	
Arizona.			
Fort Apache	26, 27	2.14	
Connecticut.			
New London	11, 12, 13	8.93	11.98
Voluntown	11, 12, 13	8.00	11.25
Do	25, 26	2.00	
Lake Konomoc	10 to 14	6.17	9.24
Wallingford	10 to 14	5.85	8.77
Shelton	10 to 14	4.86	7.79
Middletown	10 to 14	5.30	7.43
Hartford *b*	10 to 14	4.63	6.35
Hartford *a*	11, 12	3.62	6.16
Bethel	11, 12, 13	3.25	
Do	25	2.00	
New Haven	11, 12	3.44	
Delaware.			
Cape Henlopen	11	2.04	
Dist. of Columbia.			
Washington City	11, 12	2.06	
Kentucky.			
Richmond	2, 3	2.50	
Louisiana.			
Liberty Hill	27	2.00	
Maine.			
Gardiner	25, 26	2.55	7.25
Kent's Hill	25, 26, 27	3.00	6.60
Cornish			6.00
Bridgeton			6.00
Bar Harbor	12, 13	3.50	
Portland	12, 13	2.97	
Orono	25, 26, 27	2.60	
Maryland.			
Baltimore	11	2.60	
Fort McHenry	10, 11	2.24	
Massachusetts.			
Fall River	11, 12, 13	8.13	11.17
Taunton *c*	10 to 14	6.91	9.56
North Beverly	10 to 14	7.06	9.55
Long Plain	10 to 14	5.88	8.80
Taunton *a*	10 to 14	6.83	8.85
Wellesley	10 to 14	5.70	8.82
Beverly Farms	10 to 14	6.60	8.79
Somerset	11, 12, 13	6.80	8.70
Taunton *b*	10 to 14	6.53	8.67
South Hingham	10 to 14	6.51	8.50
Blue Hill Ob'y			8.29
Chestnut Hill	10 to 14	6.09	7.89
Waltham	10 to 14	6.08	7.84
Salem	10 to 14	6.21	7.83
Cambridge *c*	10 to 14	5.70	7.82
Milton	11, 12, 13	5.60	7.70
Taunton *d*	11, 12, 13	6.83	7.52
Lynn	10 to 14	5.68	7.47
Cambridge *b*	10 to 14	5.63	7.35
Medford	10 to 14	5.58	7.31
Mystic Lake	10 to 14	5.64	7.20
Winchester	10 to 14	5.45	7.15
New Bedford *b*	10 to 14	4.51	7.05
Boston	12	4.45	7.04
New Bedford *a*	10 to 14	4.51	6.97
Quincy	10 to 14	5.54	6.90
Lake Cochituate	10 to 14	4.95	6.86
Newburyport	10 to 14	4.78	6.75
Westvale	10 to 14	4.93	6.56
Lowell *c*			6.54
Mystic Station	10 to 14	5.11	6.51
Concord *a*	10 to 14	4.90	6.40
Concord *b*	10 to 14	4.59	6.35
Worcester	11, 12, 13	4.75	6.32
Westborough	11, 12, 13	4.63	6.28
Framingham	10 to 14	4.64	6.28
Lowell *a*	10 to 14	4.36	6.26
Massachusetts—C'd			
Lawrence	10 to 14	4.31	6.19
Milford	10 to 14	4.04	
Dudley	11, 12, 13	3.90	
Princeton	11, 12, 13	4.07	
Amherst *a*	11, 12, 13	2.66	
Amherst *b*	11, 12, 13	2.35	
Hopkinton	10 to 14	4.76	
Lowell *b*	10 to 14	4.54	
Melrose	10 to 14	5.60	
Princeton	10 to 14	4.07	
Mississippi.			
Vicksburg	10, 11	2.07	
Missouri.			
Springfield	1, 2	2.10	
New Brunswick.			
Parker's Ridge			8.30
Saint John			6.08
New Hampshire.			
Mt. Washington	12, 13	7.44	9.03
Lake Village	11, 12, 13	2.40	
Weir's Bridge	12, 13	2.54	
Bristol	13	2.11	
Woodstock	11, 12, 13	2.22	
Belmont	11, 12	2.68	
Wolfborough	11, 12, 13	3.14	
Nashua	12, 13	3.66	
New Jersey.			
Clayton	3, 4	4.50	8.00
Sandy Hook	11	4.10	6.53
Moorestown			6.02
South Orange	11, 12, 13	2.50	
Vineland	10, 11	3.22	
Atlantic City	11, 12	2.70	
New York.			
Setauket	11, 12, 13	4.76	7.08
White Plains	11	3.25	6.40
New York City	11	3.17	
Oregon.			
Bandon	6, 7	2.01	
Pennsylvania.			
Germantown	3, 4	2.27	6.97
Do	11	2.25	
West Chester	11	2.14	6.22
Mahanoy Plane	3, 4	3.50	
Fallsington	11	2.25	
Quakertown	11	2.60	
Philadelphia	11, 12	2.07	
Rhode Island.			
Block Island	11, 12	5.76	14.05
Providence *b*	10 to 14	9.04	11.83
Olneyville	10 to 14	8.30	11.55
Providence *a*	10 to 14	8.13	11.31
Pawtucket	10 to 14	7.92	11.18
Lonsdale	10 to 14	7.69	10.74
Narragansett P'r	12, 13	7.80	10.64
Woonsocket *a*	10 to 14	6.74	
Woonsocket *b*	10 to 14	6.38	
Tennessee.			
Dickson			6.63
Trenton			6.47
Memphis			6.43
Milan	2	2.04	6.21
Austin	3, 4	2.10	
Texas.			
San Antonio	23, 24	2.05	
Brownsville	21, 22	2.03	
Virginia.			
Bird's Nest	11	2.03	
Fort Monroe	11, 12	3.30	
Chincoteague	11, 12	2.18	
Washington Ter.			
Tatoosh Island	6	2.73	10.29
Do	9, 10	2.05	
Pysht	6	2.01	7.81
Do	10, 11	2.07	

TEMPERATURE OF WATER.

Observations were interrupted by ice throughout the month at Escanaba, Marquette, Alpena, Mackinaw City, and Detroit, Michigan; Duluth, Minnesota; Milwaukee, Wisconsin; Toledo and Sandusky, Ohio; Buffalo, New York; and at Cleveland, Ohio, from the 1st to 11th, 16th, 17th, 20th to 28th; Chicago, Illinois, 1st to 22d, 27th, 28th; Chincoteague, Virginia, 4th to 8th.

The following table shows the highest and lowest temperatures of water observed at the several stations; the monthly ranges of water temperature; the average depth at which the observations were made; and the mean temperature of the air:

Temperature of water for February, 1886.

Station.	Temperature at bottom.		Range.	Average depth, feet and tenths.	Mean temperature of the air at station.
	Max.	Min.			
	°	°	°		°
Atlantic City, New Jersey	36.3	27.9	8.4	6.9	29.9
Alpena, Michigan*					
Augusta, Georgia	50.7	40.2	10.5	9.4	44.7
Baltimore, Maryland	36.9	31.6	5.3	9.8	31.3
Block Island, Rhode Island	37.0	28.3	8.7	8.1	28.4
Boston, Massachusetts	35.0	29.2	5.8	20.8	26.6
Buffalo, New York*					
Cedar Keys, Florida	61.5	45.9	15.6	7.6	54.0
Charleston, South Carolina	50.8	44.5	6.3	38.3	47.6
Chicago, Illinois *	33.6	32.5	1.1	8.0	28.1
Chincoteague, Virginia *	43.2	29.8	13.4	2.3	33.6
Cleveland, Ohio*	34.9	32.3	2.6	14.0	25.4
Detroit, Michigan *					
Duluth, Minnesota *					
Eastport, Maine	37.1	31.5	5.6	17.1	20.9
Escanaba, Michigan*					
Galveston, Texas	57.3	46.0	11.3	12.2	53.5
Grand Haven, Michigan *	32.6	32.1	0.5	19.0	23.1
Indianola, Texas	62.5	42.6	19.9	7.8	55.9
Jacksonville, Florida	58.6	50.0	8.6	18.0	53.5
Key West, Florida	70.7	62.2	4.5	17.7	66.0
Mackinaw City, Michigan*					
Macon, Fort, North Carolina	53.8	37.0	16.8	10.6	42.9
Marquette, Michigan*					
Milwaukee, Wisconsin *					
Mobile, Alabama	50.9	44.0	6.7	16.2	49.7
New Haven, Connecticut	35.0	30.3	4.7	16.1	26.1
New London, Connecticut	35.5	31.2	4.3	13.1	27.8
New York City	33.9	30.5	3.4	17.4	28.5
Norfolk, Virginia	43.3	32.6	10.7	16.2	37.7
Pensacola, Florida	57.8	50.2	7.6	16.7	51.2
Portland, Maine	34.6	29.5	5.1	16.8	21.5
Portland, Oregon	46.4	43.0	3.4	56.5	44.7
Sandusky, Ohio*					
Sandy Hook, New Jersey	35.9	29.0	6.9	5.5	28.8
San Francisco, California	57.6	54.7	2.9	39.1	55.8
Savannah Georgia	51.1	41.0	10.1	10.1	50.6
Smithville, North Carolina	53.8	35.0	18.8	10.8	43.7
Toledo, Ohio*					
Wilmington, North Carolina					

* Observations interrupted by ice; see text.

WINDS.

The most frequent directions of the wind during February, 1886, are shown on chart ii by the arrows flying with the wind; they are also given in the tables of miscellaneous meteorological data. In the upper Missisippi and Missouri valleys, New England, and the middle Atlantic states, the prevailing winds were mostly from the northwest; in the Lake region and Ohio Valley they were from south to southwest; in Washington Territory they were from south and southwest; in California from northeast to northwest; in other districts they were variable.

HIGH WINDS.

[*In miles per hour.*]

Mount Washington, New Hampshire: the eight-hour movement of the wind from 3 to 11 p. m. of the 26th was 925 miles, being at the rate of 115.6 miles per hour, and largely in excess of any previous eight-hour movement ever recorded at this station. The total movement of the wind for the twenty-four hours ending 3 p. m. of the 27th was 2,673 miles, being 533 miles in excess of any previous twenty-four hour movement. During the night of the 26–27th the terrific hurricane caused the building to rock and tremble; huge masses of frost-work were dashed against the station building with reports as loud as the discharge of cannon.

Wind-velocities of fifty or more miles per hour were recorded during the month, as follows:

Mount Washington, New Hampshire, 75, ne., 2d; 63, nw., 3d; 85. nw., 5th; 74, nw., 6th; 82, nw., 8th; 78, nw., 9th; 62, se., 11th; 94, s., 12th; 94, sw., 13th; 68, nw., 14th; 66, nw., 18th; 74, nw., 19th; 78, nw., 20th; 96, nw., 21st; 60, nw., 22d; 70, nw., 23d; 84, nw., 24th; 94, se., 25th; 138, nw., 26th; 131, nw., 27th.

Pike's Peak, Colorado, 54, n., 3d; 76, w., 8th; 60, ne., 9th; 72, w. 12th; 62, w., 13th; 51, n., 15th; 53, nw., 17th; 64, nw., 18th; 51, w., 20th.

Cape Mendocino, California, 62, se., 4th; 72, se., 5th; 75, se., 6th; 52, se., 22d.

Sandy Hook, New Jersey, 55, ne., 11th; 56, nw., 20th; 62, nw., 26th; 72, nw., 27th.

Fort Canby, Washington Territory, 64, sw., 6th; 52, sw., 7th; 50, s., 11th,

Fort Maginnis, Montana, 60, w., 11th; 78, nw., 13th.

Valentine, Nebraska, 75, nw., 18th; 52, nw., 24th.

Chincoteague, Virginia, 52, nw., 20th; 61, nw., 26th.

New York City, 64, nw., 26th; 56, nw., 27th.

Block Island, Rhode Island, 54, n., 4th.

Cape Henry, Virginia, 52, n., 4th.

Tatoosh Island, Washington Territory, 56., se., 8th.

Fort Shaw, Montana, 52, sw., 11th.

Fort Assinaboine, Montana, 55 w., 11th.

Fort Benton, Montana, 58, sw., 11th.

Rochester. New York, 54, w., 13th.

Fort Totten, Dakota, 56, nw., 24th.

Buffalo, New York, 57, w., 25th.

Sandusky, Ohio, 51, nw., 26th.

LOCAL STORMS.

Little Rock, Arkansas: a severe thunder-storm, moving from southwest to northeast and accompanied by heavy rain, occurred at 11.10 p. m. of the 9th; the lightning, which was intense, struck a dwelling and damaged it to the amount of $250.

NAVIGATION.

In the following table are shown the danger-points at the various river stations; the highest and lowest depths for February, 1886, with the dates of occurrence, and the monthly ranges:

Heights of rivers above low-water mark, February, 1886.

[*Expressed in feet and tenths.*]

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
Red River:						
Shreveport, Louisiana	29.9	12	16.1	25	11.4	4.7
Arkansas River:						
Fort Smith, Arkansas	22.0	14	14.9	1	3.2	11.7
Little Rock, Arkansas*	23.0	15	15.8	8	4.3	11.5
Missouri River:						
Yankton, Dakota *	24.0					
Omaha, Nebraska *	18.0					
Leavenworth, Kansas	20.0	28	8.4	22	6.9	1.5
Mississippi River:						
Saint Paul, Minnesota *	14.5					
La Crosse, Wisconsin *	24.0					
Dubuque, Iowa *	16.0					
Davenport, Iowa *	15.0					
Keokuk, Iowa *	14.0	24, 25	14.7	23	13.0	1.7
Saint Louis, Missouri	32.0	13	23.1	22	13.9	9.2
Cairo, Illinois	40.0	21, 22	38.5	10	30.7	17.8
Memphis, Tennessee	34.0	25, 26	29.6	12	14.8	14.8
Vicksburg, Mississippi	41.0	28	37.7	15	23.7	14.0
New Orleans, Louisiana	13.0	28	12.1	17, 18	8.0	4.1
Ohio River:						
Pittsburg, Pennsylvania	22.0	14	19.5	7	3.0	16.5
Cincinnati, Ohio	50.0	17	40.1	10	14.1	26.0
Louisville, Kentucky	25.0	19	15.4	11	7.2	8.2
Cumberland River:						
Nashville, Tennessee	40.0	17	35.2	8, 9	8.7	26.5
Tennessee River:						
Knoxville, Tennessee		1, 19	4.2	11	1.8	2.4
Chattanooga, Tennessee	33.0	14	13.1	10	5.5	7.6
Monongahela River:						
Pittsburg, Pennsylvania	29.0	14	19.5	7	3.0	16.5
Savannah River:						
Augusta, Georgia	32.0	5	11.5	25	8.2	3.3
Mobile River:						
Mobile, Alabama		11, 14	17.3	20	15.3	2.0
Sacramento River:						
Red Bluff, California		1	9.6	26	2.7	6.9
Sacramento, California		1	25.0	28	19.8	5.2
Willamette River:						
Portland, Oregon		4	17.1	28	4.3	12.8
Colorado River:						
Yuma, Arizona		1	16.4	23 to 28	15.3	1.4

* Observations interrupted by ice; see text.

STAGE OF WATER IN RIVERS.

The Mississippi River was frozen throughout the month at all stations north of Keokuk, Iowa; at Keokuk an ice dam in the river caused the water to rise 0.7 feet above the danger-line on the 24th and 25th.

The Missouri River at Fort Buford, Dakota, rose and flowed over the ice from the 12th to the 20th, the ice remaining solid throughout the month; the river was also frozen during the month at Yankton, Dakota, and Omaha, Nebraska.

The Ohio River at Pittsburg, Pennsylvania, rose steadily during the 12th and 13th, and reached its maximum height, 19.5 feet, at 11 a. m. of the 14th; the lowest stage recorded during the month was 3.0 feet, on the 7th; navigation was resumed on the 15th.

The Cumberland River at Nashville, Tennessee, rose rapidly on the 11th and reached its highest stage, 35.2 feet, on the 17th.

ICE IN RIVERS AND HARBORS.

Mississippi River.—Keokuk, Iowa: river frozen from 1st to 22d; the ice in the river moved about half a mile on the 22d, and at 2.45 p. m. of the 23d a general movement of the ice began, leaving the river clear in front of this station, but later in the day an ice dam formed half a mile below this city, which continued until the close of the month.

Saint Louis, Missouri: the ice gorge in the river broke on the 10th, but again gorged after moving about one hundred feet, it also broke and gorged on the 13th and finally broke on the 14th and passed out, leaving the harbor clear; navigation was resumed on the 17th; floating ice, 24th, 25th, 26th.

Cairo, Illinois: river frozen, 1st to 11th; ice broke and run out on the 12th; at Belmont, Missouri, twenty-one miles below this city, the Iron Mountain incline was crushed and about one hundred feet was carried away on the 13th; six barges were also carried away; on the 13th the break in the ice extended fifty miles above this city, the ice piling twenty feet high along the bank of the river; at Spie's Mills, above this place, the ice was reported piled sixty feet high; on the 14th the ice broke as far as Saint Louis, but owing to the heavy drifts the river was not navigable; navigation was resumed between this city and Saint Louis on the 17th; floating ice was observed in the river from the 15th to 24th.

Memphis, Tennessee: floating ice in the river, 4th to 8th, 15th.

Missouri River.—Fort Benton, Montana: ice in the river broke and moved out on the 11th.

Vermillion, Clay county, Dakota: the ice in the river broke on the 22d.

Leavenworth, Kansas: ice in the river broke on the 20th and moved out, causing but little damage; floating ice was observed from the 21st to 28th.

Platte River.—Yutan, Saunders county, Nebraska: ice in river broke on 24th.

Walnut Creek.—El Dorado, Butler county, Kansas: ice broke on the 14th.

Big Blue River.—Manhattan, Riley county, Kansas: river opened on the 18th.

Arkansas River.—Fort Smith, Arkansas: ice in the river broke and navigation resumed on the 1st.

Little Rock, Arkansas: river froze, 3d to 7th; navigation resumed on the 8th.

Illinois River.—Pekin, Tazewell county, Illinois: ice broke in the river and began to move out on the 14th.

Ohio River.—Pittsburg, Pennsylvania: ice was observed in the river every day during the month.

Parkersburg, Wood county, West Virginia: navigation was resumed on the 17th; floating ice, 22d, 28th.

Cincinnati, Ohio: floating ice in the river, 3d, 4th, 5th, 7th to 10th.

Vevay, Switzerland county, Indiana: the first steamer since the suspension of navigation arrived on the 10th; floating ice in the river, 10th, 11th, 18th.

Louisville, Kentucky: floating ice in the river from 3d to 12th.

Cairo, Illinois: floating ice in the river, 1st to 12th.

Grand River.—Grand Haven, Michigan: river frozen, 1st to 12th, 16th to 22d, 26th.

Saint Clair River.—Port Huron, Michigan: the river was open from Lake Huron to Marysville, Michigan, on the 11th; floating ice in river, 24th to 26th.

Sandusky River.—Tiffin, Seneca county, Ohio: ice in the river broke on the 11th.

Lake Erie.—Buffalo, New York: ice in the lake was very much broken on the 13th, and moved in large fields down the Niagara River.

Hudson River.—Menand Station (near Albany), New York: the ice broke in the upper Hudson on the 14th and gorged at a point oppsite this station.

Albany, New York: an ice dam formed on the 13th, which remained unbroken up to the close of the month.

New York City: floating ice in the river interfered with navigation on the 3d, 5th, 8th.

Casco Bay.—Portland, Maine: ice formed in the harbor on the 5th and 6th.

Mount Hope Bay and Taunton River.—Fall River, Massachusetts: navigation for sailing vessels on the bay and river was suspended from the 5th to 9th.

Connecticut River.—Hartford, Connecticut: the ice in the river broke at noon of the 15th, destroying Chapin's dock in its passage.

New Haven Bay.—New Haven, Connecticut: harbor frozen on the 5th; steamers experienced great difficulty in breaking their way to the docks.

Long Island Sound.—Setauket, Suffolk county, New York: harbor clear of ice on the 13th, but froze again on the 28th.

Sandy Hook Bay.—Sandy Hook, New Jersey: ice in the bay interfered with navigation on the 5th and 28th.

Susquehanna River.—Catawissa, Columbia county, Pennsylvania; the ice which gorged in the north branch of the river on January 31st broke up and passed out without doing damage on the 13th.

Delaware River.—Beverly, Burlington county, New Jersey: the river channel was clear of ice on the 13th; the Philadelphia ice-boat went up the river as far as Burlington, New Jersey, and returned during the morning of the 14th; large quantities of ice and debris floated down all day.

Philadelphia, Pennsylvania: ice in river broke and passed off without doing much damage on the 14th.

Delaware Bay.—Cape Henlopen: large quantities of ice in the bay impeded navigation on the 8th, 9th, 14th.

Patapsco River and Chesapeake Bay.—Baltimore, Maryland: ice in the river and bay seriously interfered with navigation from the 6th to 16th.

Potomac River.—Washington City: a very rapid rise in the river occurred on the 13th; the ice broke and ran out in large quantities.

Chincoteague Bay.—Chincoteague, Virginia: bay frozen, 4th to 12th, causing the suspension of navigation.

Kitty Hawk Bay.—Kitty Hawk, North Carolina: bay frozen, 5th to 11th.

Pamlico Sound.—Hatteras, North Carolina: sound frozen from the 6th to 10th.

Cape Fear River.—Smithville, North Carolina: considerable floating ice in the river on the 6th.

Currituck Sound.—Wash Woods, North Carolina: sound frozen from the 3d to 9th.

FLOODS.

Maryland.—Port Deposit, Cecil county: about 4.30 p. m. of the 12th the ice in the Susquehanna River broke and the water rapidly rose, overflowed its banks, and swept through the lower portion of the town, flooding the streets to the depth of three or four feet; subsequently the water found vent and receded; at 4 p. m. of the 13th an ice gorge formed and at 8 p. m. the water again rose until it reached a height two feet higher than in the disastrous freshet of 1875; houses, outbuildings, and sheds of all kinds were caught up by the flood and crushed by the heavy running ice, lumber-yards and wharves were inundated, and immense quantities of lumber carried away. The damage is estimated at $50,000.

Pennsylvania.—Harrisburg, Dauphin county: the ice in the Susquehanna River broke at this place on the morning of the

13th, and gorged at various points, causing a rapid rise in the river; the track of the Pennsylvania Railroad was submerged and much damage done by the heavy floating ice; a portion of the town was four feet under water. At Middletown, this county, the current was so strong after the gorge gave way that a channel fifty feet wide was washed through one of the large islands in the river. The damage is estimated at from $25,000 to $30,000.

Williamsport, Lycoming county: at midnight of the 13th the ice in the Susquehanna River broke and the water rose to the height of seventeen feet, doing considerable damage.

Norristown, Montgomery county: an ice gorge formed in the Schuylkill River on the 12th and caused a freshet; the rising water compelled the stoppage of nearly all the mills.

Reading, Berks county: an ice gorge formed about midnight of the 11th at Shomakerville, fifteen miles north of this place; large blocks of ice were piled many feet high and when the water rose the ice was pushed on the adjoining lowlands, sweeping away trees, fences, small out-buildings, and flooding many farm houses; the gorge broke on the morning of the 12th, and great damage was done to property in this vicinity.

Philadelphia: the heavy rain of the 11–12th caused the water in the Schuylkill River to reach a higher point than at any time since 1861; mills were flooded, and considerable damage done to property along the banks of the river.

New Jersey.—Trenton, Mercer county: a heavy freshet occurred in the Delaware River on the 12th; the water rose as high as the second story of dwellings in some places. Between this city and Bordentown several ice-houses were swept away, and huge blocks of ice were heaped along the river banks; the Pennsylvania shore was submerged and railroad trains delayed. The loss was very heavy, falling mostly on the poorer classes. Such a disastrous flood has not been experienced since the freshet of 1857.

New Brunswick, Middlesex county: the heavy rain and previous thaw dislodged the ice in the Raritan River and carried it down the stream where it formed a dam on the 12th, causing the river to overflow, flooding the neighboring streets and buildings along the banks; the cables and telegraph poles at the landings in the lower part of the city were carried away.

Bound Brook, Somerset county: the Raritan River overflowed its banks on the 12th, completely inundating the lower part of the town; the water was eight inches deep on the floor of the post office; mills were submerged and compelled to shut down, and a small bridge on the Lehigh Valley Railroad was carried away.

Newark, Essex county: the river rose two feet above high-water mark on the 12th, and many of the streets and wharves were inundated.

Elizabeth, Union county: Elizabeth River overflowed on the 12th, compelling people living on the banks to move to the upper floors for safety; ten thousand tons of cut ice were carried away.

Rahway, Union county: the Rahway River was greatly swollen on the 12th; many houses were flooded, streets inundated, bridges carried away, and a large quantity of lumber lost.

Jamesburg, Middlesex county: two railroad bridges were washed away by the freshet of the 12th, and considerable damage done.

Long Branch, Monmouth county: the heavy rain of the 11th did considerable damage; several factories and mills were flooded, and Mill street was entirely submerged.

New York.—Schenectady, Schenectady county: the ice in the Mohawk River broke at 4.30 p. m. of the 13th and gorged against the bridges, causing a rapid rise in the water; in half an hour it was one foot above the highest point ever known at this place; streets were flooded to the depth of ten feet, the water flowing over the Scotia Embankment (twenty-one feet high) and flooding the flats for a distance of several miles back. Large blocks of ice floated about the submerged streets, smashing doors and windows; a large number of factories were compelled to suspend work on account of the high water. The damage is difficult to estimate.

Troy, Rensselaer county: the ice in the Hudson River above the state dam broke about 9 p. m. of the 13th and gorged in the narrows below; at 1 a. m. of the 14th the river began to rise rapidly and almost immediately recede, this state of affairs continued until 7 a. m., when a steady rise set in; at noon the water had reached the height of twenty-six feet above low-water mark, or within four inches of the height attained by the memorable flood of February 9, 1857. Many of the streets in the lower part of the city were submerged, and the railroad track between this city and Albany was rendered impassable. The loss in the city will approximate half a million dollars. Reports from Nassau, this county, state that a large covered bridge was carried away, and at Quacken Kill the water and ice carried away three bridges.

Albany: the river rose rapidly during the morning of the 14th, and at noon a freshet of fifteen feet prevailed; considerable damage was done by the flooding of cellars and basements, railroad trains were delayed on account of washouts, and great damage was reported from all points along the banks of the river.

Nyack, Rockland county: the severest rain storm for several years occurred on the 11th, causing freshets in all the streams; the main thoroughfare from this town into the interior of the county was covered with water to the depth of four feet. At Orangeburg the water was so deep over the track of the West Shore Railroad as to interfere with the running of trains.

Connecticut.—New London: the heavy rain of the 11–12th, together with the snow on the ground (amounting to six or seven inches), which melted and added to the immense volume of water that fell, caused freshets everywhere throughout New London county. The ice in the Thames River rose in great floes before the flood and was soon broken up; the streets throughout the city were submerged and cellars flooded; the total damage within the city limits amounts to $20,000, while the loss in the county will aggregate more than a million dollars. The great dam on the Shetucket River (built three years ago at a cost of $200,000), which furnished the power that turned the wheels of a dozen mills, was carried away.

Norwich, New London county: the heaviest rain for years occurred on the 11–12th; the water in the Shetucket and Yantic Rivers, which form a junction with the Thames at this point, overflowed, causing the most destructive flood in the history of the state; the entire eastern portion of the city was inundated, deluging farms, breaking reservoirs, and carrying away bridges. At Jewett City, twelve miles north of this city, the Ashland Company's dam, two of the Slater Mill dams, dye house, machine shop, and two iron railway bridges were swept away, causing a loss of $200,000. The dam at Greenville, two miles above this city, was also washed away, causing a loss of $100,000. The total loss in this portion of the state will exceed one million dollars.

New Haven: the Quinnipiac River overflowed the lowlands northeast of this city on the 13th; washouts occurred on railroads, and bridges and dams were carried away.

Rhode Island.—Providence: the heavy rainfall produced floods in this city and throughout the state on the 12th almost unprecedented; hundreds of dams and bridges were swept away, mill property seriously damaged, and thousands of operators thrown out of employment. It is estimated that the damage will amount to more than a million dollars.

Woonsocket, Providence county: the freshet of the 12th destroyed the water-works reservoir and caused heavy washouts along the line of the railroads; nearly all the mills were compelled to shut down. The damage will amount to many thousand dollars.

At Newport, mill property was greatly damaged and roads badly washed; at Westerly, Washington county, several houses and bridges were carried away; at Phœnix, Kent county, the Harrisville dam was destroyed, and the ice did great damage to mills; at Saylesville, Providence county, the damage caused by the flood amounts to nearly $100,000.

Hartford, Hartford county: the heavy rainfall of the 11–13th caused a freshet in the Connecticut River, and in all streams throughout the state; at towns within eight to twelve miles of this place mills were inundated; at Meriden, eighteen miles south, several large factories were compelled to suspend operations. Numerous washouts occurred on the New York and New England Railroad, preventing the running of trains.

Massachusetts.—Boston: the heavy rain of the 12–13th, together with six or seven inches of snow on the ground, caused one of the most destructive floods in the south end of the city that has ever occurred; it is estimated that the damage in Boston alone will amount to half a million dollars.

Fall River, Bristol county: the heavy rain of the 11–13th turned the streets and flats into rivers and ponds, filling cellars and basements of several mills, doing great damage to the stock. Numerous washouts occurred along the line of the railroad. The damage in this city will amount to $10,000.

Peabody, Essex county: the worst freshet ever known at this place occurred on the 12th; streets were inundated and cellars flooded. The loss is estimated at from $25,000 to $30,000.

Brockton, Plymouth county: the flood in the Salisbury River on the 12th inundated several factories, compelling the suspension of work and seriously damaging the stock and machinery; streets were submerged, and the bridge over the main thoroughfare carried away. The damage to property, both public and private, will amount to nearly $100,000.

Malden, Middlesex county: Barrett's Pond overflowed on the 12th, flooding the lower floors of all buildings on its banks. Goods in Cochran's print and turkey-red works were damaged to the amount of $20,000; the cotton factory of George K. Goulding was flooded, and $10,000 worth of cotton ruined. The loss in this city is estimated at $50,000.

Franklin, Norfolk county: in addition to the large loss resulting from the flood, the Cumberland dam of the Pautucket water-works, built last fall, was swept away on the 12th, causing a loss of $100,000.

Foxborough, Norfolk county: the flood of the 12th caused damage to mills and factories to the amount of $37,000.

Gloucester, Essex county: the flood of the 12th was the most destructive ever known; streets were impassable, houses flooded, and great damage done.

New Bedford, Bristol county: the heavy rain of the 11–12th caused considerable damage in the northern part of the city; several washouts occurred on the line of the Old Colony Railroad.

Taunton, Bristol county: the rainfall of the 11–12th was the greatest for the past eighteen years; Mill River overflowed its banks, flooding the streets, filling cellars, and causing washouts on the railroads. Most of the bridges in the city were carried away or badly damaged, and gullies in some cases fifty feet wide were cut in the streets. All the dams in the river were swept away or rendered useless. The damage is estimated at $200,000.

Somerset, Bristol county: the heavy rains of the 11–12th caused a destructive flood; dams and bridges were washed away, roads deeply gullied and made impassable, fields turned into lakes, and many cellars flooded. Mails were delayed four days owing to the damage done to railroads.

Natick, Middlesex county: a large washout occurred at this place on the Boston and Albany Railroad, the break being fifty feet wide and fifteen feet deep; railroad traffic was suspended from noon of the 13th until the evening of the 15th.

The damage by the flood at Winchester, Middlesex county, is estimated at $35,000; Newton, Middlesex county, $25,000; Quincy, Norfolk county, $25,000; Watertown, Middlesex county, $20,000; at Wollaston, Norfolk county, the lowlands were flooded to the depth of ten feet, and many families had to be moved in boats; two dams were washed away at Stoughton, Norfolk county, and great damage was done at Attleborough, Bristol county.

Illinois.—Pekin, Tazewell county: the Illinois River rose to eleven feet above "tidal" mark on the 15th and continued high until the 23d; the lowlands were submerged on the 19th.

HIGH TIDES.

Eastport, Maine, 19th, 20th, 21st, 22d.
Jersey City, New Jersey, 12th.

LOW TIDES.

New York City: the high wind of the 26–27th blew a large portion of the water out of the harbor, causing the lowest tide known for many years; at high tide during the afternoon of the 27th the water was below the ordinary low-water mark.

Philadelphia, Pennsylvania: owing to the unusually low tide on the 27th and 28th vessels were unable to make their way up or down the river.

Low tides were also reported from the following stations:
Sandy Hook, New Jersey, 27th.
Chincoteague, Virginia, 19th to 22d.
Indianola, Texas, 16th, 19th.

VERIFICATIONS.

INDICATIONS.

The detailed comparison of the tri-daily indications for districts east of the Rocky Mountains during February 1886, with the telegraphic reports for the succeeding thirty-two hours, shows the general average percentage of verifications to be 83.90 per cent. The percentages for the four elements are: Weather, 87.32; direction of the wind, 83.73; temperature, 81.19; barometer, 82.69 per cent. By geographical districts, they are: For New England, 81.68; middle Atlantic states, 84.95; south Atlantic states, 87.85; eastern Gulf states, 87.68; western Gulf states, 84.65; lower lake region, 83.28; upper lake region, 81.48; Ohio Valley and Tennessee, 84.34; upper Mississippi valley, 80.29; Missouri Valley, 83.15. There was one omission to predict, out of 2,894, or 0.03 per cent. Of the 2,893 predictions that have been made, ninety, or 3.11 per cent., are considered to have entirely failed; one hundred and two, or 3.52 per cent., were one-fourth verified; three hundred and forty-eight, or 12.03 per cent., were one-half verified; five hundred and one, or 17.32 per cent., were three-fourths verified; 1,852, or 64.02 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

The percentages of verifications of special predictions for certain localities are, as follows:

Omaha, Nebraska (twenty-four days), 81.25; Arkansas (twenty-four days), 85.42; Baltimore, Maryland (twenty-four days), 87.00; Washington City, 86.16; Portland, Maine, 76.34; Boston, Massachusetts, 83.93; Albany, New York, 75.89; Pittsburg, Pennsylvania, 75.00; Erie, Pennsylvania, 71.88; Lynchburg, Virginia, 77.23; Cincinnati, Ohio, 77.67; Louisville, Kentucky, 79.46; Columbus, Ohio, 77.22; Cleveland, Ohio, 73.21; Oswego, New York, 75.90; Rochester, New York, 71.88; Buffalo, New York, 70.54; Indianapolis, Indiana, 81.70; Detroit, Michigan, 76.79; Toledo, Ohio, 75.00; Sandusky, Ohio, 76.79; Cairo, Illinois, 83.04; Saint Louis, Missouri, 82.14; Kansas (eighteen days), 87.50; Saint Paul, Minnesota, 75.89; Iowa, 79.91; Milwaukee, Wisconsin, 70.54; Chicago, Illinois, 75.00; Memphis, Tennessee, 85.71; Tennessee, 84.82; Shreveport, Louisiana, 84.38; Georgia, 87.95; northern Florida, 84.82; western Missouri (eleven days), 85.23; New York City, 88.84; Philadelphia, Pennsylvania, 83.48; Colorado, 90.18.

CAUTIONARY SIGNALS.

During February, 1886, one hundred and forty-six cautionary signals were ordered. Of these, one hundred and thirty, or 89.04 per cent., were justified by winds of twenty-five miles or more per hour at or within one hundred miles of the station. Fifty-three cautionary off-shore signals were ordered, of which number, forty-nine, or 92.45 per cent., were fully justified, both as to direction and velocity; fifty-two, or 98.11 per cent., were justified as to direction; and forty-nine, or 92.45 per cent., were justified as to velocity. One hundred and ninety-nine signals of all kinds were ordered, one hundred and seventy-nine, or 89.95 per cent., being fully justified. These do

not include signals ordered at display stations where the velocity of the wind is only estimated. Of the above cautionary off-shore signals, forty-four were changed from cautionary. Three signals were ordered late. In twenty-eight cases, winds of twenty-five miles or more per hour were reported for which no signals were ordered.

COLD-WAVE SIGNALS.

During February, 1886, two hundred and sixty-eight cold-wave signals were ordered, of which number, two hundred and forty-seven, or 92.12 per cent., were justified.

RAILWAY WEATHER SIGNALS.

Prof. P. H. Mell, jr., director of the "Alabama Weather Service," in the report for February, 1886, states:

The verifications of predictions for the whole area was 91 per cent. for temperature, and 83 per cent. for weather.

The following corporations comprise this system: South and North; Montgomery and Mobile; Mobile and Girard; Georgia Pacific; East Tennessee, Virginia and Georgia system in Alabama; Memphis and Charleston; Columbus Western; Atlanta and West Point of Georgia; Northeastern of Georgia; Western and Atlantic; East Tennessee, Virginia and Georgia system in Georgia; Montgomery and Eufaula; Pensacola and Selma; Pensacola and Atlantic; and the City of Miledgeville, Georgia.

ATMOSPHERIC ELECTRICITY.

AURORAS.

Auroral displays occurred during February, as follows:

Escanaba, Michigan: an auroral arch of a pale orange color was observed above a faint segment at 11.18 p. m. of the 3d; beams were observed to shoot up from the ends of the arch; the display continued until 1.35 a. m. of the 4th.

Saint Vincent, Minnesota: an aurora was observed at 8.15 p. m. of the 3d; it first appeared as a pale diffused whitish light having an altitude of 20° and extending from 175° to 210° azimuth; at 10.15 p. m. numerous slender beams were observed, some of which attained an altitude of 30°; the display continued until 2 a. m. of the 4th.

Manistique, Schoolcraft county, Michigan: a faint auroral light, having an altitude of 12° and extending from northwest to northeast, was observed at 7 p. m. of the 7th.

Fort Buford, Dakota: an aurora was observed at 9.18 p. m. of the 10th, consisting of an arch of a whitish color; when first observed it was about 20° above the horizon and rose slowly until at 11 p. m. it attained its maximum altitude, about 45°, and extended from northwest to northeast; a second arch, about 30° in altitude, formed below the first, from which several streamers rose to the upper arch. The lower arch gradually faded away after 11.20 p. m., the upper arch continuing until 11.53 p. m.

Bismarck, Dakota: a faint auroral light of a pale yellow color, extending from 135° to 225° azimuth and having an altitude of 20° and resting on a dark segment 15° in height, was observed at 11.35 p. m. of the 10th.

Burlington, Chittenden county, Vermont: an aurora was observed at 11.55 p. m. of the 10th, consisting of a bright yellow light rising above a bank of clouds in the northern horizon.

Fort Totten, Dakota: an auroral arch was observed from 9.15 p. m. of the 10th until 4.30 a. m. of the 11th, having an altitude of 20° and azimuth 100°.

Tiffin, Seneca county, Ohio: an aurora was observed at 3 a. m. of the 13th, of about 40° azimuth and having an altitude of 10°; its illuminating effect was almost equal to that of dawn and was characterized by recurring fits of brilliancy.

Chincoteague, Virginia: an auroral arch was observed at 10.40 p. m. of the 17th lasting until 1.10 a. m. of the 18th; it extended from about 20° to 180° azimuth with an altitude of 45°; the color was occasionally a brilliant yellowish white but most of the time a dull gray; during the last stages of the display there appeared to be two parallel bands of a grayish white which soon changed to a diffused light and faded away.

Cambridge, Middlesex county, Massachusetts: an aurora was suspected between 8 and 9 p. m. of the 22d.

Saint Vincent, Minnesota: a faint auroral light extending from 175° to 260° azimuth with an altitude of 15° was observed at 9.45 p. m. of the 22d, the display lasting until after midnight.

Auroral displays were also observed during the month, as follows:

2d.—Mountainville, New York; Winnipeg, Manitoba.

3d.—Fort Totten, Dakota; Winnipeg, Manitoba; Montreal, Quebec.

5th.—Winnipeg, Manitoba.

6th.—Pekin, Illinois; Winnipeg, Manitoba.

7th.—Escanaba and Mackinaw City, Michigan; Webster, Dakota; Pekin, Illinois.

8th.—Pekin, Illinois.

9th.—New Westminster, British Columbia.

10th.—Moorhead, Minnesota; Poplar River, Montana; Webster and Richardton, Dakota.

11th, 12th, 16th.—Winnipeg, Manitoba.

22d.—Eastport and Kent's Hill, Maine; Winnipeg, Manitoba; Sydney, Nova Scotia.

24th.—Bar Harbor, Maine; Winnipeg, Manitoba.

28th.—Montreal, Quebec.

THUNDER-STORMS.

Thunder-storms were reported in the various states and territories, as follows:

Alabama.—Mobile, 3d.

Arizona.—Tucson, 25th, 26th; Fort Verde and Prescott, 22d; San Carlos, 23d; Yuma, 26th.

Arkansas.—Mount Ida, 2d; Little Rock, 10th, 14th.

California.—Cahuenga Valley, 2d, 25th; Red Bluff, 26th; Santa Barbara, 28th; Princeton, 27th.

Colorado.—West Las Animas and Colorado Springs, 27th.

Florida.—Pensacola, 3d.

Georgia.—Savannah, 3d.

Illinois.—Golconda and Philo, 11th; Bluffdale, 18th.

Kansas.—Independence, Yates Centre, Elk Falls, and El Dorado, 24th.

Kentucky.—Penrod, 11th.

Louisiana.—Liberty Hill, 2d; New Orleans, 3d; Grand Coteau, 2d, 10th; Shreveport, 2d, 9th, 10th.

Maine.—Eastport, 15th.

Massachusetts.—Somerset and Blue Hill Observatory, 15th.

Michigan.—Traverse City, 24th.

Mississippi.—Vicksburg, 2d, 3d, 10th, 11th.

Missouri.—Lamar, 9th; Carthage, 25th.

New Hampshire.—Mount Washington, 14th.

New Jersey.—Readington, 25th.

New Mexico.—Lava, 22d; Gallinas Spring, 23d; Puerto de Luna, 23d, 26th.

North Carolina.—Wilmington, Smithville, Fort Macon, and Hatteras, 3d; Weldon, 19th.

Ohio.—Columbus, 12th.

Pennsylvania.—Philipsburg, 19th.

South Carolina.—Charleston, 3d; Stateburg, 3d, 28th.

Tennessee.—Milan, 10th; Nashville, Grief, Parksville, and Hurricane Switch, 11th; Hohenwald and Trenton, 10th, 11th.

Texas.—El Paso, 1st; New Ulm, 1st, 27th; Galveston, 2d, 9th, 10th; Palestine, 9th, 10th; San Antonio, 10th, 23d; Brownsville, 21st; Fort Elliott, 23d, 24th.

Vermont.—Lunenburg, 14th; Strafford, 15th.

Virginia.—Bird's Nest, 25th.

West Virginia.—Parkersburg, 12th.

ELECTRICAL PHENOMENA.

Captain J. W. Cates, of the brig "Arcat," reports that at 9 a. m. of the 9th, when in latitude 23° 20′ N., longitude 83° 25′ W., a heavy storm of wind, rain, and lightning came from the north and northwest; at 10.15 a. m. a ball of lightning struck on the deck load of cedar and exploded, sending abundance of sparks in all directions. No shock was felt, although the captain and two others were standing within twenty feet of where the ball struck. There was no damage done nor any mark left.

Table of miscellaneous meteorological data for February, 1886—Signal Service observations.

Stations.	Elevation above sea-level.	Atmospheric pressure: Mean actual barometer.	Atmospheric pressure: Departure from normal.	Atmospheric pressure: Mean reduced barometer.	Extremes: Highest barometer	Date.	Extremes: Lowest barometer	Date.	Monthly range of barometer.	Temperature: Monthly mean.	Temperature: Departure from normal.	Extremes: Max.	Date.	Mean max.	Min.	Date.	Mean min.	Monthly range.	Daily ranges: Greatest.	Date.	Least.	Date.	Mean rel. humidity.	Mean dew-point.	Precipitation.	Departure from normal.	Winds: Total movement.	Prevailing direction.	Maximum velocity: Miles p. h.	Direction.	Date.	No. of rainy days.	No. of cloudy days.	No. of fair days.	No. of clear days.
New England.																																			
Eastport	61	29.83	—.09	29.92	30.90	11	28.58	26	2.32	20.9	— 1.4	48.6	13	29.6	—14.0	5	13.2	62.6	27.3	25	5.2	1	76.3	14.3	3.25	— 0.88	8,736	nw.	40	nw.	28	16	14	11	3
Portland	99	29.85	—.09	29.96	30.82	11	28.75	26	2.07	21.5	— 4.4	51.5	14	30.0	—10.2	6	13.9	61.7	34.7	25	6.7	11	77.9	15.4	5.52	+ 2.26	6,972	nw.	40	nw.	26	9	7	13	8
Mount Washington	6,279	23.34	......	29.96	30.84	11	28.94	26	1.91	5.6	— 0.7	41.0	13	15.7	—39.2	27	— 3.9	80.2	47.3	26	4.8	18	91.1	4.8	9.03	+ 5.04	29,276	nw.	138	nw.	26	11	2	16	10
Boston	125	29.85	—.09	29.99	30.73	11	28.96	26	1.76	26.6	— 1.2	57.3	13	35.2	— 6.6	5	18.2	63.9	39.0	26	3.2	11	70.7	17.9	7.04	+ 3.40	10,621	nw.	49	nw.	26	10	8	10	10
Block Island	27	29.98	......	30.00	30.57	11	29.10	26	1.47	28.4	— 3.1	52.0	15	35.8	— 1.0	5	22.1	53.0	30.3	26	3.0	11	79.8	22.8	14.05	+ 8.14	13,453	sw.	54	nw.	27	12	4	16	8
Narragansett Pier	......	......	......	......	......	...	......	...	......	28.0	......	52.0	16	36.5	— 6.0	5	19.4	58.0	......	...	......	...	......	......	10.64	+ 5.62	......	......	......	......	...	12	...	...	...
New Haven	107	29.91	......	30.02	30.58	11	29.23	25	1.35	26.1	— 3.0	51.2	15	35.2	— 7.7	5	18.2	58.9	32.4	26	5.9	12	74.5	18.8	5.95	+ 1.70	7,175	sw.	34	nw.	27	11	6	13	9
New London	47	29.93	—.08	30.03	30.62	11	29.14	26	1.48	27.8	— 1.6	50.5	13	35.6	— 4.2	6	20.1	54.7	33.6	26	1.6	11	77.1	21.2	11.98	+ 8.32	6,084	nw.	43	nw.	27	13	5	16	7
Mid. Atlantic States.																																			
Albany	83	29.98	—.05	30.07	30.64	11	29.21	25	1.43	22.6	— 2.3	51.3	15	32.0	—10.7	5	14.4	62.0	36.4	26	5.8	11	71.0	14.3	1.40	— 1.32	6,046	s.	34	w.	20	10	8	14	6
New York City	164	29.88	—.07	30.05	30.52	10	29.21	25	1.31	28.5	— 2.6	55.8	9	37.1	— 1.8	5	21.3	57.6	32.5	26	5.9	11	74.1	21.0	5.90	+ 2.35	11,125	nw.	64	nw.	26	9	3	12	13
Philadelphia	117	29.95	—.07	30.07	30.52	5	29.30	25	1.22	30.9	— 2.6	65.6	15	40.5	— 2.4	5	23.3	68.0	29.6	15	7.2	11	72.5	22.6	4.62	+ 1.44	9,512	nw.	48	nw.	26	8	4	12	11
Atlantic City	13	30.04	—.07	30.04	30.48	5	29.25	25	1.23	29.9	— 3.5	50.3	18	37.9	— 2.3	5	22.3	52.6	28.8	3	4.7	11	79.3	23.9	4.92	+ 1.58	7,527	nw.	37	nw.	26	7	7	11	10
Sandy Hook	28	30.03	—.07	30.05	30.53	10	29.23	25	1.30	28.8	— 2.9	53.5	15	37.3	— 2.2	5	22.5	55.7	27.1	21	2.0	11	79.1	22.9	6.53	+ 2.93	14,667	nw.	72	nw.	27	9	2	15	11
Cape Henlopen	......	......	......	......	......	...	......	...	......	29.6	......	44.6	18	32.1	15.1	5	27.0	29.5	......	...	......	...	......	......	4.44	+ 1.43	......	......	......	......	...	9	...	...	...
Baltimore	45	30.06	—.05	30.10	30.58	5	29.33	25	1.25	31.3	— 5.6	66.9	15	41.6	— 1.1	5	24.5	68.0	31.9	20	5.3	11	69.2	21.8	5.49	+ 2.12	4,821	nw.	36	nw.	26	8	4	16	8
Ocean City	......	......	......	......	......	...	......	...	......	34.3	......	57.0	16	41.2	— 1.2	4	27.5	58.2	......	...	......	...	......	......	3.22	— 0.51	......	......	......	......	...	6	...	...	...
Washington City	106	30.00	—.04	30.10	30.62	5	29.37	25	1.25	32.1	— 3.7	67.5	15	42.4	— 2.3	5	23.9	69.8	35.5	9	7.1	4	76.2	24.8	4.32	+ 1.08	5,313	nw.	38	nw.	26	7	4	16	8
Cape Henry	16	30.09	—.04	30.09	30.58	5	29.36	25	1.22	36.6	— 5.9	71.8	15	45.4	5.4	5	29.0	66.4	35.6	26	6.1	24	74.0	28.6	3.39	— 0.21	10,228	nw.	52	n.	4	7	3	8	17
Chincoteague	8	30.08	—.04	30.08	30.54	5	29.30	25	1.24	33.6	— 4.1	56.2	15	42.0	2.4	5	26.7	53.8	31.0	26	8.4	17	73.1	25.5	5.11	+ 1.33	10,784	nw.	61	nw.	26	7	2	13	13
Lynchburg	652	29.40	—.03	30.10	30.62	5	29.49	25	1.13	35.7	— 4.5	65.2	15	46.9	1.3	5	26.4	63.9	39.5	8	5.2	11	72.7	26.8	3.81	+ 0.37	3,432	s.	27	nw.	26	7	6	13	9
Norfolk	30	30.09	—.04	30.10	30.60	5	29.39	25	1.20	37.7	— 5.3	70.8	15	48.5	3.5	5	29.1	67.3	31.0	26	7.4	11	70.8	28.6	4.03	+ 0.13	5,043	n.	28	s.	15	10	2	11	15
South Atlantic States.																																			
Charlotte	808	29.26	—.02	30.12	30.64	5	29.64	25	1.00	40.1	— 5.7	68.0	23	50.6	5.9	5	29.6	63.1	34.7	21	6.0	12	61.0	26.1	2.76	— 1.88	4,080	sw.	26	nw.	20	6	5	9	14
Fort Macon	11	30.12	—.02	30.10	30.57	5	29.54	25	1.04	42.9	— 5.2	65.2	10	50.3	11.3	5	36.1	53.9	24.2	6	6.2	17	82.4	37.8	2.34	— 0.74	9,790	sw.	44	nw.	20	9	3	11	14
Hatteras	12	30.10	—.04	30.09	30.55	5	29.54	25	1.01	41.9	— 5.3	67.3	11	50.5	13.0	5	34.5	54.3	31.5	27	6.4	17	74.1	33.7	2.29	— 2.90	8,651	n.	40	nw.	26	9	5	8	15
Kitty Hawk	9	30.11	—.05	30.10	30.57	5	29.44	25	1.13	38.1	— 5.7	66.8	15	46.4	3.4	5	31.2	61.4	25.3	3	3.6	17	75.1	30.5	4.38	+ 0.41	10,486	n.	48	n.	3	9	3	10	15
New River Inlet	......	......	......	......	......	...	......	...	......	45.2	......	67.2	11	54.5	9.1	5	35.9	58.1	......	...	......	...	......	......	1.25	......	......	......	......	......	...	8	...	...	...
Smithville	34	30.08	—.05	30.10	30.60	5	29.63	25	0.98	43.7	— 5.7	64.8	10	51.4	9.9	5	36.1	54.9	26.9	21	6.9	11	75.6	36.1	2.16	— 0.78	7,278	ne.	40	sw.	25	8	4	9	15
Charleston	52	30.10	—.01	30.12	30.63	5	29.77	3	0.86	47.6	— 5.1	72.3	23	56.3	13.3	5	39.7	59.0	29.5	4	7.5	11	69.4	36.7	2.13	— 1.56	4,580	ne.	24	nw.	20	7	6	10	12
Augusta	183	29.98	—.01	30.14	30.68	5	29.75	3	0.93	44.7	— 5.9	71.3	14	57.9	13.0	5	33.6	58.3	37.9	8	6.8	28	65.8	31.7	1.70	— 2.23	2,887	w.	19	n.	4	6	6	10	12
Savannah	87	30.07	—.01	30.13	30.63	5	29.78	3	0.85	50.6	— 3.7	70.3	23	60.1	19.0	5	42.4	51.3	27.4	4	3.7	28	71.3	40.8	2.38	— 1.75	5,479	nw.	28	nw.	20	9	7	9	12
Jacksonville	43	30.11	—.01	30.12	30.59	5	29.84	3	0.76	53.5	— 4.7	72.6	25	62.5	24.3	5	45.8	48.3	26.6	9	7.4	17	77.9	45.9	1.87	— 1.63	3,913	ne.	30	sw.	25	7	6	10	12
Florida Peninsula.																																			
Cedar Keys	22	30.09	—.05	30.07	30.50	5	29.80	28	0.71	54.0	— 7.1	72.8	24	61.7	26.5	5	47.4	46.3	25.2	6	5.2	25	82.9	48.5	1.17	— 2.58	5,495	ne.	25	nw.	4	8	6	9	13
Key West	20	30.10	—.01	30.07	30.34	5	29.84	9	0.50	66.0	— 5.7	82.3	28	71.5	52.3	5	62.1	30.0	13.4	15	5.6	10	83.7	60.7	0.13	— 1.85	7,068	ne.	31	n.	5	3	3	15	10
Sanford	25	30.13	......	30.12	30.53	5	29.82	28	0.71	57.3	— 4.6	78.7	25	67.7	31.3	5	48.5	47.4	30.7	14	7.3	27	76.4	49.1	1.18	— 1.61	3,997	n.	28	n.	5	5	5	12	11
Eastern Gulf States.																																			
Atlanta	1,129	28.95	—.01	30.14	30.61	5	29.80	25	0.81	41.9	— 5.7	65.3	23	51.6	8.4	5	32.4	56.9	27.2	21	8.4	27	58.4	26.7	1.53	— 4.20	7,800	nw.	32	nw.	4	7	6	9	13
Pensacola	30	30.13	.00	30.11	30.61	5	29.75	27	0.86	51.2	— 5.9	71.0	23	59.9	20.3	5	43.6	50.7	28.1	23	5.9	25	68.9	39.7	2.18	— 2.09	5,021	ne.	21	s.	3	7	6	9	13
Mobile	35	30.12	+.01	30.12	30.63	5	29.79	27	0.84	49.7	— 4.9	70.7	23	58.4	19.3	5	40.5	51.4	29.4	23	7.2	27	74.5	40.9	2.15	— 2.32	6,037	n.	28	n.	4	6	5	12	11
Montgomery	219	29.92	.00	30.13	30.68	5	29.73	3	0.91	47.2	— 5.3	73.0	14	57.9	14.4	5	36.6	58.6	30.0	23	7.3	27	65.2	34.7	4.10	— 1.27	4,432	w.	22	nw.	15	5	10	8	10
Vicksburg	209	29.93	+.01	30.13	30.68	5	29.68	13	1.00	48.1	— 4.5	74.9	14	59.4	16.0	5	38.7	58.9	38.1	13	10.0	27	66.8	36.4	4.97	— 0.25	4,014	s.	30	n.	15	8	8	10	10
New Orleans	52	30.09	+.01	30.11	30.60	5	29.71	27	0.89	53.2	— 4.9	74.0	24	63.4	25.0	5	44.9	49.0	31.6	3	8.3	25	68.3	41.7	1.96	— 2.19	5,777	se.	26	se.	2	4	7	11	10
Western Gulf States.																																			
Shreveport	227	29.82	+.01	30.11	30.65	5	29.59	13	1.06	48.8	— 2.3	77.2	13	60.1	19.8	5	38.2	57.4	40.9	13	7.8	27	65.3	36.5	4.77	— 0.30	......	se.	......	......	...	7	8	10	10
Fort Smith	470	29.62	.00	30.12	30.64	4	29.51	9	1.13	38.5	— 0.7	69.0	23	49.8	1.9	4	28.4	67.1	36.1	22	4.8	11	68.5	27.9	2.38	— 3.63	4,140	e.	21	ne.	25	5	6	11	11
Little Rock	299	29.80	+.01	30.09	30.65	4	29.51	13	1.14	40.8	— 6.2	72.8	13	51.1	7.6	4	31.2	65.2	44.1	13	7.5	11	72.5	31.8	4.27	— 3.35	4,057	e.	30	w.	25	8	7	7	14
Galveston	40	30.11	+.04	30.11	30.64	5	29.69	9	0.94	53.5	— 3.5	71.0	25	59.4	31.6	4	47.1	39.4	20.8	19	5.0	21	77.9	46.2	2.31	— 0.55	7,951	e.	37	nw.	15	8	4	11	13
Indianola	26	30.09	+.01	30.08	30.60	5	29.64	9	0.96	55.9	— 1.6	73.0	24	63.2	27.9	3	48.4	45.1	25.5	7	2.7	21	81.5	49.7	3.29	+ 1.47	11,156	e.	48	sw.	14	7	6	7	15
Palestine	533	29.56	.00	30.10	30.59	5	29.65	9	0.94	50.2	— 1.7	82.2	13	61.8	23.8	3	40.2	58.4	33.9	13	11.5	25	68.0	38.7	3.95	+ 0.65	6,825	s.	32	s.	13	9	7	9	12
San Antonio	781	29.29	......	30.09	30.52	4	29.63	9	0.89	55.3	— 0.4	89.8	14	68.3	25.2	3	42.3	64.6	43.4	12	7.9	23	57.1	37.1	3.15	+ 1.32	5,791	n.	42	n.	15	6	9	9	10
Rio Grande Valley.																																			
Brownsville	59	30.05	+.03	30.06	30.52	4	29.63	9	0.89	61.2	— 0.6	81.3	8	72.2	35.5	4	53.3	45.8	36.9	12	5.7	21	79.5	53.8	2.33	+ 0.56	6,060	s.	29	s.	24	8	11	9	8
Rio Grande City	230	29.91	+.06	30.07	30.53	4	29.61	9	1.08	61.8	— 0.7	88.0	14	73.9	35.0	4	51.7	53.0	39.3	13	4.0	21	60.7	45.4	1.72	+ 0.65	3,278	n.	21	se.	21	4	8	7	13
Ohio Val. & Tenn.																																			
Chattanooga	783	29.33	+.01	30.16	30.70	5	29.74	25	0.96	38.9	— 6.5	64.6	23	49.9	7.5	5	28.9	57.1	33.3	8	7.9	27	69.5	27.9	3.28	— 2.10	4,681	ne.	34	nw.	25	10	8	7	13
Knoxville	980	29.10	.00	30.16	30.69	5	29.68	25	1.01	37.1	— 4.7	66.0	11	47.3	— 4.1	5	26.8	70.1	34.3	6	9.9	13	71.4	27.4	2.62	— 2.39	4,059	n.	36	w.	19	7	12	5	11
Memphis	321	29.81	+.03	30.14	30.71	4	29.64	13	1.07	39.9	— 4.9	65.0	9	48.2	5.8	4	32.2	59.2	26.3	22	5.5	27	67.0	28.5	6.43	+ 1.21	4,837	se.	32	nw.	20	10	6	6	16
Nashville	549	29.54	.00	30.12	30.68	5	29.69	13	0.99	35.4	— 7.5	61.5	14	45.5	— 6.6	5	25.0	68.1	37.9	6	2.6	2	71.0	25.8	3.82	— 1.51	4,545	e.	35	nw.	25	10	8	9	11
Louisville	551	29.55	+.03	30.14	30.69	5	29.57	25	1.12	32.7	— 5.9	61.0	24	41.4	— 0.2	5	23.3	61.2	33.6	8	6.5	11	71.7	24.0	1.94	— 2.77	5,943	s.	33	w.	25	9	7	11	10
Greencastle	897	29.13	......	30.11	30.62	4	29.50	25	1.12	29.4	......	59.7	9	38.2	— 1.8	3	21.3	61.5	31.6	19	4.9	11	75.7	22.4	2.33	......	6,461	s.	28	nw.	25	10	12	10	6
Indianapolis	766	29.27	+.01	30.11	30.65	5	29.48	25	1.17	28.2	— 4.6	54.5	10	36.5	— 4.2	5	19.9	58.7	31.8	25	5.0	11	76.4	21.2	1.51	— 2.11	5,163	s.	28	w.	25	9	11	11	6
Cincinnati	628	29.45	+.02	30.14	30.71	5	29.54	25	1.17	30.1	— 7.0	62.9	11	38.6	— 0.8	5	21.6	63.7	35.7	8	7.3	4	70.3	21.2	1.65	— 2.34	5,765	sw.	34	nw.	25	9	9	12	7
Columbus	805	29.23	+.01	30.13	30.68	5	29.51	25	1.16	27.5	— 5.0	60.6	11	35.5	— 5.4	5	18.2	66.0	34.0	17	6.0	13	71.6	19.3	1.26	— 2.60	5,589	sw.	32	w.	25	5	11	10	7
Pittsburg	766	29.26	—.01	30.11	30.64	5	29.40	25	1.24	30.3	— 2.3	62.7	10	39.5	— 3.0	5	21.6	65.7	29.2	9	5.0	7	80.6	24.8	1.39	— 1.11	5,553	s.	28	nw.	26	15	11	13	4
Lower lake region.																																			
Buffalo	690	29.28	—.02	30.07	30.61	5	29.25	25	1.35	23.4	— 1.2	55.8	12	32.6	—12.1	5	16.0	67.9	31.8	20	4.2	7	81.8	18.4	4.00	+ 1.53	9,264	sw.	57	w.	25	19	16	9	3
Oswego	335	29.67	—.04	30.05	30.57	5	29.27	25	1.30	21.2	— 4.5	48.8	10	29.1	—14.9	5	13.4	63.7	32.4	26	3.7	11	81.3	16.1	2.19	— 0.30	9,100	s.	40	nw.	26	14	20	5	3
Rochester	621	29.36	—.01	30.06	30.55	5	29.30	25	1.26	23.1	— 1.3	56.1	9	32.1	— 5.7	5	16.0	61.8	27.4	20	3.8	4	85.4	19.3	2.18	— 0.37	9,138	sw.	54	w.	13	19	19	7	2
Erie	681	29.31	—.02	30.07	30.62	5	29.28	25	1.34	23.9	— 4.2	57.9	10	35.1	—11.3	5	15.6	69.2	34.8	24	4.5	7	77.6	17.4	3.43	+ 0.17	8,892	s.	37	nw.	26	18	12	13	3
Cleveland	690	29.31	—.02	30.09	30.67	5	29.36	25	1.31	25.4	— 2.3	55.5	10	34.1	— 7.0	5	16.3	62.5	31.0	17	7.0	4	79.5	19.5	1.55	— 1.14	8,447	s.	28	sw.	17	12	9	17	2
Sandusky	639	29.39	+.01	30.10	30.64	5	29.35	25	1.29	26.5	— 3.4	61.0	11	33.7	— 8.0	5	17.4	69.0	34.2	25	5.6	7	74.3	19.1	1.12	— 2.02	10,403	sw.	51	nw.	26	11	11	13	4
Toledo	651	29.37	+.01	30.10	30.65	4	29.33	25	1.31	25.2	— 3.9	58.2	11	33.6	— 8.1	5	17.5	66.3	33.0	25	2.8	7	75.4	18.2	1.32	— 0.67	6,787	sw.	40	sw.	25	12	11	15	2
Detroit	661	29.33	—.02	30.08	30.62	4	29.29	25	1.34	28.0	+ 1.4	54.1	11	35.8	— 2.6	5	19.4	56.7	33.1	19	8.1	12	78.0	21.9	1.30	— 1.10	8,214	sw.	35	nw.	25	12	14	12	2
Upper lake region.																																			
Alpena	609	29.33	—.02	30.04	30.54	28	29.12	25	1.42	16.0	— 2.0	42.0	25	24.7	—23.0	5	7.6	65.0	39.9	25	3.4	12	80.3	10.9	1.30	— 0.96	6,755	w.	35	w.	25	15	12	10	6
Escanaba	608	29.34	—.01	30.06	30.67	4	29.19	25	1.49	14.5	— 1.1	38.4	11	23.7	—18.8	3	5.8	57.2	37.8	25	4.1	12	79.0	9.1	1.84	+ 0.47	6,533	nw.	34	n.	19	17	14	9	5
Grand Haven	600	29.32	—.04	30.02	30.60	4	29.30	25	1.30	23.1	— 2.3	49.1	9	30.4	—14.6	3	15.8	63.7	32.8	25	5.7	13	80.2	17.8	3.50	+ 1.55	8,076	s.	36	n.	5	18	17	8	3
Mackinaw City	605	29.32	—.04	30.02	30.63	4	29.09	25	1.54	17.3	+ 5.4	44.9	7	25.9	—19.0	4	7.3	63.9	41.3	25	4.1	13	70.2	9.0	1.19	— 2.70	7,087	nw.	39	e.	9	15	10	11	7
Marquette	672	29.25	—.05	30.04	30.64	4	29.35	24	1.30	14.9	— 3.6	50.5	7	26.1	—14.4	3	6.8	64.9	48.8	25	4.2	12	85.2	11.0	1.18	— 0.22	7,389	w.	38	sw.	7	15	14	8	6
Port Huron	633	29.34	—.01	30.06	30.61	4	29.23	25	1.38	21.3	— 1.6	48.9	11	28.1	—13.0	5	13.7	61.9	29.8	25	3.3	13	81.0	16.2	2.11	— 0.38	8,252	s.	36	sw.	25	13	12	13	3
Chicago*	661	29.33	—.01	30.07	30.63	4	29.38	25	1.25	28.1	0.0	55.6	9	38.9	— 6.3	3	19.9	61.9	39.7	25	4.6	15	76.7	21.4	1.51	— 0.81	6,895	s.	29	sw.	23	9	7	15	5
Milwaukee	697	29.26	—.02	30.05	30.63	4	29.38	25	1.25	21.1	— 2.5	43.9	8	28.9	—15.6	2	13.7	59.5	33.7	25	3.6	28	84.6	17.2	2.36	+ 0.49	9,045	nw.	39	w.	25	14	9	14	5
Duluth	672	29.30	.00	30.10	30.71	4	29.44	24	1.27	12.4	— 3.7	55.4	7	23.9	—25.0	4	3.2	80.4	37.0	6	5.0	28	76.0	6.1	1.81	+ 0.72	6,084	nw.	40	ne.	9	15	7	16	5
Extreme northwest.																																			
Moorhead	923	29.03	—.03	30.13	30.71	3	29.53	24	1.18	7.5	+ 2.4	50.7	7	20.0	—37.0	2	— 4.4	87.7	53.7	16	7.1	28	87.4	4.4	0.78	— 0.23	9,934	n.	44	s.	4	11	10	13	5
Saint Vincent	804	29.20	—.01	30.18	30.78	3	29.55	24	1.23	4.9	+ 4.5	49.5	7	17.4	—35.8	3	— 6.3	85.3	37.8	24	9.9	10	81.8	0.2	0.46	+ 0.07	7,997	nw.	45	nw.	24	12	4	18	6
Bismarck	1,694	28.19	.00	30.17	30.63	3	29.69	24	0.94	15.8	+ 5.1	56.0	7	31.6	—25.0	3	4.4	81.0	51.9	24	8.1	28	83.7	11.5	0.54	— 0.11	5,072	nw.	39	ne.	9	9	5	16	7
Fort Buford	1,930	27.95	—.01	30.17	30.59	1	29.74	23	0.85	17.4	+ 8.8	51.2	7	30.5	—26.0	2	6.0	77.2	41.7	24	11.2	28	83.1	12.9	0.71	+ 0.22	6,811	ne.	46	nw.	24	12	10	16	2
Fort Totten	1,490	28.40	......	30.15	30.67	3	29.61	24	1.06	6.6	......	45.4	7	19.6	—38.0	3	— 5.8	83.4	49.3	16	10.2	28	82.6	2.4	0.79	......	11,042	nw.	56	nw.	24	11	8	14	6
Fort Yates	......	......	......	......	......	...	......	...	......	20.5	......	50.3	7	32.1	—19.2	1	8.8	77.5	......	...	......	...	......	......	0.62	— 0.26	......	......	......	......	...	8	...	...	...

Table of miscellaneous meteorological data for February, 1886—*Signal Service observations*—Continued.

Stations.	Elevation above sea-level.	Atmospheric pressure: Mean actual barometer.	Departure from normal.	Mean reduced barometer.	Extremes: Highest barometer	Date.	Lowest barometer	Date.	Monthly range of barometer.	Temperature of the air: Monthly mean.	Departure from normal.	Extremes: Max.	Date.	Mean max	Min.	Date.	Mean min.	Monthly range.	Daily ranges: Greatest.	Date.	Least.	Date.	Mean rel. humidity.	Mean dew-point.	Precipitation.	Departure from normal.	Winds: Total movement.	Prevailing direction.	Maximum velocity: Miles p. hr	Direction.	Date.	No. of rainy days.	No. of cloudy days.	No. of fair days.	No. of clear days.
Upper Miss. Valley.																																			
Saint Paul	831	29.11	—.02	30.07	30.69	4	29.49	24	1.20	15.0	— 3.1	49.0	7	25.5	—28.1	2	4.3	77.1	42.5	20	5.3	28	79.1*	9.4	0.25	— 0.77	4,791	w.	26	w.	24	8	10	11	7
La Crosse	725	29.24	—.02	30.05	30.67	4	29.47	24	1.21	21.8	+ 0.2	52.0	24	31.6	—28.0	3	13.2	80.0	31.0	25	4.1	13	72.7	14.4	0.81	— 0.31	6,280	s.	35	w.	21	10	10	10	8
Davenport	615	29.40	.00	30.10	30.65	4	29.48	13	1.17	23.1	— 3.8	49.1	8	32.7	—17.6	2	15.3	66.7	35.1	25	3.6	28	74.3	16.0	1.52	— 0.03	6,910	nw.	32	nw.	25	7	9	10	9
Des Moines	849	29.15	—.02	30.10	30.71	4	29.52	13	1.19	24.7	+ 0.6	51.8	24	33.4	—20.0	4	16.1	71.8	31.5	16	5.1	27	78.1	18.9	0.52	— 1.02	3,950	n.	22	n.	19	6	8	15	5
Dubuque	665	29.33	......	30.07	30.64	16	29.49	13	1.15	21.8	— 2.2	48.0	7	31.3	—21.2	3	12.8	69.2	38.1	25	4.3	28	76.0	15.3	1.36	— 0.16	3,870	nw.	20	nw.	25	11	8	13	7
Keokuk	618	29.41	.00	30.10	30.69	4	29.47	13	1.22	26.3	— 3.3	56.3	22	36.0	—17.7	4	17.7	74.0	35.1	25	8.3	28	77.4	19.7	1.40	— 0.31	6,315	nw.	31	e.	27	9	4	14	10
Cairo	359	29.76	+.01	30.14	30.69	4	29.62	13	1.07	35.1	— 5.1	60.2	24	42.2	— 2.6	4	26.9	62.8	29.6	21	5.2	10	66.6	23.8	2.54	— 1.80	5,922	nw.	28	nw.	19	10	8	8	12
Springfield	644	29.40	—.01	30.09	30.64	4	29.49	13	1.15	31.0	— 0.9	58.0	22	42.0	—11.1	3	22.2	69.1	34.5	22	8.9	21	70.4	22.5	1.86	— 3.04	8,044	s.	36	s.	24	8	7	10	11
Saint Louis	571	29.50	+.01	30.12	30.66	4	29.51	13	1.15	35.1	— 0.4	63.6	8	45.8	— 7.9	3	27.4	71.5	29.5	5	8.0	9	69.7	25.7	1.71	— 1.33	8,897	s.	41	sw.	25	8	6	9	13
Missouri Valley.																																			
Lamar	1,028	29.01	......	30.14	30.70	4	29.48	9	1.22	34.3	......	62.9	23	43.0	—10.0	4	23.2	72.9	32.5	7	5.4	11	70.6	25.9	1.22	......	7,655	s.	36	sw.	9	11	5	10	12
Leavenworth	842	29.20	—.01	30.14	30.74	4	29.46	9	1.28	30.2	— 1.4	61.5	22	41.0	—10.0	3	21.0	71.5	34.1	22	8.7	27	72.0	22.1	0.61	— 0.92	5,465	nw.	25	nw.	24	7	7	9	12
Omaha	1,113	28.90	—.01	30.13	30.69	4	29.53	8	1.17	24.4	— 1.9	64.3	24	38.0	—19.4	4	14.8	83.7	38.4	20	10.3	28	78.3	18.3	0.36	— 0.47	5,881	nw.	34	nw.	24	5	3	9	16
Valentine	2,603	27.29	......	30.13	30.47	19	29.61	8	0.86	27.0	......	66.4	7	40.3	—19.3	3	16.5	85.7	37.9	5	9.5	2	67.0	16.2	0.35	......	9,113	nw.	75	nw.	18	7	9	12	7
Huron	1,307	28.63	—.05	30.15	30.65	3	29.56	8	1.09	18.7	+ 6.1	59.5	7	31.4	—27.2	4	7.3	86.7	47.2	16	8.1	10	81.5	13.8	0.16	— 0.22	6,767	nw.	38	nw.	24	4	5	17	6
Yankton	1,228	28.73	—.03	30.15	30.64	3	29.51	8	1.13	22.9	+ 3.3	65.6	7	34.4	—24.8	4	11.8	90.4	44.7	16	5.1	28	78.7	16.8	0.57	— 0.27	6,989	nw.	36	nw.	24	8	4	12	12
Northern slope.																																			
Fort Assinaboine	2,720	27.10	—.04	30.16	30.46	14	29.77	26	0.69	30.3	+16.1	63.2	23	41.1	—15.3	2	18.5	78.5	41.2	4	11.9	27	64.1	19.4	0.77	+ 0.19	9,417	sw.	55	w.	11	6	7	7	4
Fort Benton	2,681	27.17	......	30.17	30.46	15	29.74	26	0.71	33.9	+14.1	69.1	6	47.5	—11.0	28	23.5	80.1	40.6	4	10.0	8	65.6	23.0	0.65	+ 0.15	3,019	sw.	58	sw.	11	8	9	16	3
Fort Custer	3,040	26.82	+.04	30.18	30.44	6	29.63	26	0.81	30.2	+ 9.3	62.0	13	44.6	— 4.8	2	20.3	66.8	39.3	4	10.9	28	79.8	24.1	0.74	+ 0.29	3,925	n.	......	......	...	12	9	13	6
Fort Maginnis	4,340	25.45	......	30.20	30.45	5	29.82	26	0.63	31.6	+15.2	64.8	6	44.1	— 8.6	28	22.7	73.4	51.3	3	9.7	17	63.0	19.9	1.92	+ 1.15	9,483	w.	78	nw.	13	17	13	13	2
Fort Shaw	3,550	26.29	......	30.15	30.42	15	29.72	26	0.70	35.0	+14.5	66.1	6	48.1	—21.1	28	23.6	87.2	46.8	3	6.9	2	53.3	17.8	1.01	+ 0.51	7,270	sw.	52	sw.	11	4	3	13	12
Helena	4,044	25.79	.00	30.14	30.41	15	29.69	26	0.72	34.5	+13.1	62.1	7	44.4	—12.6	28	27.4	74.7	35.9	27	8.3	14	60.4	21.2	0.56	— 0.19	6,980	sw.	44	nw.	17	7	0	16	6
Poplar River	2,030	27.85	......	30.21	30.63	15	29.74	23	0.69	16.1	......	49.8	11	29.4	—33.4	2	5.2	83.2	44.2	24	10.1	8	80.9	11.2	0.38	— 0.11	5,068	ne.	37	nw.	20	10	10	15	3
Deadwood	4,600	25.30	+.05	30.22	30.57	6	29.79	27	0.78	31.0	+ 7.3	59.3	7	40.1	— 3.0	2	22.4	62.3	28.6	8	6.4	28	72.7	22.7	1.78	+ 0.59	2,288	sw.	21	sw.	23	14	4	11	13
Cheyenne	6,105	23.96	......	30.22	30.59	6	29.74	27	0.85	33.4	+ 5.7	63.2	7	45.3	9.2	16	22.0	54.0	40.7	23	10.1	13	72.5	24.3	0.84	+ 0.62	9,161	nw.	46	nw.	13	7	4	8	16
North Platte	2,841	27.07	.00	30.15	30.48	6	29.64	27	0.85	32.8	+ 7.0	61.0	7	45.4	5.0	3	24.1	56.0	33.8	5	6.0	3	77.3	30.1	0.17	— 0.20	5,429	w.	30	nw.	9	5	5	6	17
Fort Laramie	......	......	......	......	......	...	......	...	......	35.6	......	65.0	7	49.7	5.5	2	21.4	59.5	......	...	......	...	......	......	0.28	......	......	......	...	......	...	2	...	...	...
Middle slope.																																			
Denver	5,294	24.71	+.05	30.22	30.64	6	29.72	27	0.92	38.6	+ 6.6	71.0	7	52.2	2.9	2	26.0	68.1	35.7	21	9.2	1	51.7	19.0	0.72	+ 0.24	6,753	s.	42	n.	9	4	5	12	11
Pike's Peak	14,134	17.63	......	30.34	30.08	6	29.95	27	0.85	6.2	+ 2.8	26.6	7	11.7	—19.2	14	1.2	45.8	23.5	21	4.6	2	81.4	1.5	0.84	— 0.66	17,843	w.	76	w.	8	8	2	12	14
West Las Animas	3,899	26.06	+.06	30.16	30.57	6	29.56	27	1.01	37.7	+10.6	71.2	7	55.2	8.2	3	24.5	63.0	46.5	25	13.9	2	68.0	26.0	0.13	— 0.21	5,527	w.	41	nw.	9	2	4	13	11
Concordia	1,384	28.59	......	30.12	30.63	4	29.50	9	1.12	30.7	......	62.0	24	41.9	10.5	2	21.2	72.5	39.5	20	8.4	28	82.0	25.3	0.88	......	6,761	n.	37	s.	26	5	7	7	14
Dodge City	2,517	27.43	+.02	30.13	30.51	4	29.54	27	0.98	35.0	+ 2.4	66.0	24	46.5	— 2.4	4	25.0	68.4	34.2	5	7.7	28	80.4	29.1	0.46	— 0.08	7,350	nw.	40	s.	20	7	4	7	17
Fort Reno	......	......	......	......	......	...	......	...	......	39.7	......	70.0	22	52.1	— 7.3	3	27.3	77.3	......	...	......	...	......	......	1.56	+ 0.71	......	......	...	......	...	7	...	...	...
Fort Supply	......	......	......	......	......	...	......	...	......	37.1	......	70.4	23	48.2	— 4.0	4	26.0	74.4	......	...	......	...	......	......	0.79	— 0.21	......	......	...	......	...	7	...	...	...
Fort Elliott	2,650	27.27	+.06	30.15	30.50	4	29.60	27	0.90	39.9	+ 5.0	73.7	8	54.0	5.2	5	26.8	78.9	50.8	5	13.1	2	69.3	29.2	1.44	+ 1.00	8,462	nw.	45	n.	9	5	4	11	13
Southern slope.																																			
Fort Sill	1,200	28.86	+.02	30.14	30.61	4	29.54	9	1.06	40.8	— 1.0	75.0	8	55.9	5.0	3	28.4	70.0	41.1	8	13.7	10	63.1	27.9	0.49	— 1.28	7,415	n.	39	n.	14	6	4	7	17
Abilene	1,745	28.28	......	30.16	30.55	4	29.69	9	0.86	48.0	......	83.5	11	63.1	8.9	3	36.2	74.6	50.1	5	8.7	26	64.6	35.0	0.61	......	6,494	s.	29	nw.	2	2	5	6	17
Fort Davis	4,928	25.21	+.04	30.13	30.40	6	29.77	9	0.63	47.3	— 1.0	76.3	13	63.1	18.0	17	33.2	58.3	45.2	19	9.7	25	43.1	22.2	0.39	+ 0.20	4,791	sw.	30	sw.	14	2	4	4	20
Fort Stockton	4,010	27.04	+.02	30.13	30.42	15	29.77	9	0.66	50.3	+ 1.6	86.3	13	68.3	11.3	3	34.4	75.0	48.6	18	13.5	26	47.4	27.8	0.22	— 0.62	6,183	se.	38	w.	14	3	5	8	15
Fort Stanton	......	23.95	......	......	......	6	......	9	0.66	38.0	......	65.1	7	53.6	8.7	11	25.4	56.4	44.7	5	16.8	28	57.6	22.3	0.17	......	6,027	nw.	40	nw.	8	3	0	9	19
Southern plateau.																																			
El Paso	3,764	26.30	+.05	30.15	30.50	6	29.81	1	0.68	49.8	— 0.5	76.2	13	63.8	19.9	17	34.8	56.3	42.2	19	11.5	24	45.4	27.1	0.44	— 0.01	2,985	nw.	24	ne.	14	1	2	11	15
Lava †	......	......	......	......	......	...	......	...	......	44.6	......	73.4	13	61.0	13.8	15	28.1	59.6	......	...	......	...	......	......	0.38	......	......	......	...	......	...	...	...	...	...
Santa Fé	7,026	2[illegible].26	+.05	30.26	30.60	6	29.89	26	0.71	33.3	+ 1.2	56.0	19	44.8	9.0	15	23.8	47.0	32.0	19	5.0	26	63.7	21.5	0.85	+ 0.22	5,296	n.	25	n.	10	5	3	4	21
Fort Apache	5,050	25.07	+.06	30.14	30.43	5	29.83	26	0.60	42.7	+ 4.2	71.0	19	61.5	14.5	17	26.3	56.5	52.8	19	14.4	27	53.5	24.0	2.73	+ 0.87	4,135	ne.	27	n.	22	6	1	9	18
Fort Bowie	......	......	......	......	......	...	......	...	......	46.5	......	68.8	13	54.8	30.0	14	38.3	38.8	......	...	......	...	......	......	0.88	......	......	......	...	......	...	3	...	...	...
Fort Grant	4,856	25.24	......	30.07	30.35	6	29.82	26	0.53	49.8	+ 4.1	72.4	12	61.5	29.0	16	40.4	43.4	29.1	17	10.0	24	41.4	25.0	1.29	+ 0.03	5,371	n.	40	n.	10	6	2	7	19
Fort McDowell	......	......	......	......	......	...	......	...	......	......	......	......	...	......	......	...	......	......	......	...	......	...	......	......	......	......	......	......	...	......	...	...	...	...	...
Fort Thomas	2,710	27.27	......	30.07	30.38	6	29.80	26	0.58	47.7	+ 1.1	73.8	13	66.0	18.3	17	31.5	55.5	47.0	13	12.7	26	58.6	30.1	1.40	+ 0.08	2,715	w.	25	w.	9	5	1	6	21
Fort Verde	......	......	......	......	......	...	......	...	......	50.0	+ 4.0	74.5	8	67.6	24.0	23	32.4	50.5	......	...	......	...	......	......	1.48	+ 0.48	......	......	...	......	...	5	...	...	...
Maricopa	......	......	......	......	......	...	......	...	......	58.8	......	84.0	6	75.1	33.4	18	42.6	50.6	......	...	......	...	......	......	1.65	......	......	......	...	......	...	3	...	...	...
Phœnix	......	......	......	......	......	...	......	...	......	56.9	+ 2.0	89.6	5	78.0	21.6	3	35.8	68.0	......	...	......	...	......	......	1.25	+ 0.32	......	......	...	......	...	3	...	...	...
Prescott	5,389	24.76	+.05	30.15	30.45	6	29.76	26	0.68	42.0	+ 4.8	70.4	6	58.4	18.6	17	29.0	51.8	44.2	19	7.9	26	61.5	27.3	1.15	— 0.20	3,950	sw.	38	sw.	27	5	1	7	20
San Carlos	......	......	......	......	......	...	......	...	......	52.5	......	75.6	13	67.4	24.8	17	37.6	50.8	......	...	......	...	......	......	1.29	— 2.77	......	......	...	......	...	5	...	...	...
Willcox	......	......	......	......	......	...	......	...	......	48.3	......	78.5	13	68.8	14.5	18	27.9	64.0	......	...	......	...	......	......	0.86	......	......	......	...	......	...	3	...	...	...
Yuma	141	29.87	—.06	29.99	30.34	16	29.68	26	0.66	62.7	+ 3.9	83.4	13	76.2	43.9	28	50.2	39.5	33.3	13	18.4	25	44.7	37.6	0.08	— 0.51	3,779	n.	26	n.	10	2	1	11	16
Middle plateau.																																			
Fort Bidwell	......	25.46	......	......	......	16	......	27	0.89	40.2	......	67.0	5	52.3	18.8	28	30.9	48.2	30.8	5	7.0	8	64.5	28.7	2.16	......	3,097	w.	28	w.	13	10	3	12	13
Winnemucca	4,358	25.71	+.06	30.24	30.58	16	29.70	26	0.88	40.3	+ 6.5	67.3	6	54.4	11.0	28	27.5	56.3	39.2	20	10.5	1	52.7	22.8	0.40	— 0.62	5,248	sw.	36	sw.	12	6	2	7	19
Salt Lake City	4,348	25.72	+.05	30.27	30.59	16	29.61	26	0.98	39.8	+ 6.6	63.2	7	50.5	19.8	14	31.1	43.4	28.5	23	8.1	15	67.6	29.6	1.36	— 0.03	2,822	nw.	21	nw.	14	9	7	11	10
Montrose	5,825	24.36	......	30.36	30.72	6	29.87	27	0.85	32.4	......	58.5	12	47.0	10.7	15	22.4	47.8	36.0	19	7.9	1	67.0	21.9	0.13	......	3,823	se.	44	sw.	27	4	3	13	12
Fort Bridger	......	23.52	......	......	......	6	......	26	0.91	29.2	......	52.6	5	39.9	6.3	14	19.2	46.3	36.6	23	12.0	15	67.6	19.1	0.43	......	7,182	sw.	39	w.	28	2	2	15	11
Northern plateau.																																			
Boisé City	2,750	......	......	......	......	...	......	...	......	......	......	......	...	......	......	...	......	......	......	...	......	...	......	......	......	......	......	......	...	......	...	...	...	...	...
Cœur d'Alene	......	......	......	......	......	...	......	...	......	37.0	......	59.0	22	44.6	15.0	28	29.5	44.0	......	...	......	...	......	......	0.71	— 1.20	......	......	...	......	...	8	...	...	...
Lewiston	......	......	......	......	......	...	......	...	......	......	......	......	...	......	......	...	......	......	......	...	......	...	......	......	......	......	......	......	...	......	...	...	...	...	...
Ashland	......	......	......	......	......	...	......	...	......	46.1	......	71.0	5	56.5	26.0	14	35.8	45.0	......	...	......	...	......	......	1.63	......	......	......	...	......	...	14	...	...	...
Fort Klamath	......	......	......	......	......	...	......	...	......	38.2	......	59.0	5	49.9	16.0	27	26.5	43.0	......	...	......	...	......	......	1.17	......	......	......	...	......	...	9	...	...	...
Lake View	......	......	......	......	......	...	......	...	......	44.1	......	72.0	21	57.5	21.0	14	30.7	51.0	......	...	......	...	......	......	1.26	......	......	......	...	......	...	10	...	...	...
Linkville	......	......	......	......	......	...	......	...	......	43.0	......	60.0	11	50.9	23.0	14	35.2	37.0	......	...	......	...	......	......	1.21	......	......	......	...	......	...	9	...	...	...
Fort Spokane	......	......	......	......	......	...	......	...	......	36.9	......	57.5	17	46.5	15.0	1	27.4	42.5	......	...	......	...	......	......	0.41	......	......	......	...	......	...	7	...	...	...
Spokane Falls	1,909	27.06	—.06	30.10	30.52	15	29.67	26	0.84	37.6	+10.9	55.3	18	47.0	19.4	14	29.6	35.9	28.9	25	8.5	28	85.6	33.3	0.61	— 2.26	3,136	sw.	34	sw.	23	7	4	10	14
Walla Walla	†1,018	29.02	......	......	......	...	......	...	0.92	43.2	......	66.5	11	53.9	23.2	28	35.5	43.3	21.5	4	9.9	7	72.8	34.4	1.29	......	4,361	sw.	35	sw.	23	9	10	9	9
N. Pac. coast region.																																			
Fort Canby	179	29.89	+.02	30.09	30.55	15	29.64	7	0.91	46.6	......	55.0	6	50.2	33.1	27	43.4	21.9	13.5	14	3.1	9	88.6	43.2	4.77	......	7,700	sw.	64	sw.	6	12	12	7	9
Olympia	36	30.09	+.05	30.14	30.63	15	29.67	26	0.95	43.3	+ 4.0	61.0	5	49.5	25.8	28	37.5	35.2	21.7	28	4.1	20	88.2	39.8	3.39	— 6.09	2,817	s.	19	w.	12	17	17	9	2
Port Angeles	14	30.08	......	30.10	30.60	15	29.62	7	0.98	40.3	......	58.2	16	46.9	23.6	1	33.4	34.6	21.8	6	5.1	20	90.7	37.6	2.98	......	2,236	s.	29	w.	23	17	15	12	1
Pysht	......	......	......	......	......	...	......	...	......	43.0	......	56.0	9	48.4	29.0	1	37.6	27.0	......	...	......	...	......	......	7.81	......	......	......	...	......	...	16	...	...	...
Tatoosh Island	86	29.98	+.06	30.09	30.60	16	29.55	7	1.04	44.4	......	54.9	6	48.1	34.7	13	40.8	20.2	10.9	20	3.8	1	86.2	40.4	10.29	......	10,183	sw.	56	se.	8	20	22	4	2
Astoria	......	......	......	......	......	...	......	...	......	45.1	......	62.0	5	50.3	35.0	24	39.9	27.0	......	...	......	...	......	......	5.69	......	......	......	...	......	...	18	...	...	...
Portland	80	30.05	+.02	30.14	30.61	15	29.66	26	0.95	44.7	+ 3.8	65.0	4	53.4	31.0	24	39.1	34.0	22.0	24	5.2	12	87.6	41.0	4.96	— 2.10	3,119	s.	21	s.	13	12	12	12	4
Roseburg	523	29.59	......	30.16	30.57	16	29.64	26	0.93	45.4	+ 3.0	72.1	6	54.8	30.9	25	39.9	41.2	28.0	6	7.8	12	65.2	40.9	2.44	— 2.38	1,030	n.	15	sw.	6	12	11	12	5
Mid. Pac. coast reg.																																			
Cape Mendocino	637	29.41	......	30.09	30.34	13	29.70	28	0.64	50.3	+ 4.2	61.0	3	54.5	34.5	28	46.1	26.4	14.5	20	3.8	25	84.6	45.5	1.37	— 0.69	12,926	nw.	75	se.	6	8	5	13	10
Red Bluff	332	29.76	—.03	30.10	30.41	16	29.67	27	0.73	54.5	+ 5.5	77.0	20	64.9	37.0	28	44.4	40.0	33.0	20	9.5	1	71.6	43.7	0.18	— 3.88	3,409	nw.	24	n.	15	1	1	10	17
Sacramento	64	30.03	—.04	30.08	30.38	16	29.68	27	0.69	53.3	+ 3.4	72.7	12	61.4	38.0	28	47.1	34.7	23.0	20	7.0	30	81.5	47.2	0.29	— 3.12	4,065	nw.	32	nw.	15	3	0	11	17
San Francisco	60	30.04	—.03	30.09	30.35	16	29.72	28	0.63	55.8	+ 3.9	71.0	20	63.8	41.0	28	49.9	30.0	20.5	10	5.2	25	75.2	47.4	0.24	— 3.64	4,344	nw.	25	nw.	26	4	4	8	16
S. Pac. coast region.																																			
Los Angeles	339	29.67	—.05	30.03	30.26	16	29.75	26	0.51	59.5	+ 5.4	81.0	10	71.6	41.1	16	48.5	39.9	32.7	17	8.9	22	75.5	50.8	1.41	— 2.35	4,011	ne.	29	w.	27	2	4	4	20
San Deigo	67	29.95	—.08	29.99	30.20	5	29.77	26	0.43	58.5	+ 4.0	80.3	11	68.0	44.2	20	50.1	36.1	29.6	17	4.8	26	70.8	48.1	1.51	— 0.91	3,090	nw.	20	e.	25	5	5	5	18
San Luis Obispo	270	29.75	......	30.02	30.24	16	29.69	28	0.55	56.6	......	82.0	11	69.2	38.9	28	47.5	43.1	35.5	19	6.1	27	74.2	47.8	0.81	......	5,072	n.	28	n.	1	3	1	10	17

* Record for 27 days.

† Record for 26 days.

OPTICAL PHENOMENA.

SOLAR HALOS.

Solar halos were observed in the various states and territories, as follows:

Alabama.—4th, 19th, 16th.
Arizona.—7th, 19th, 20th, 21st, 23d.
California.—5th, 6th, 7th, 15th, 16th, 19th, 21st, 23d.
Colorado.—17th.
Dakota.—13th, 15th, 17th, 20th, 25th, 26th.
Florida.—3d, 4th, 5th, 25th.
Georgia.—9th, 15th, 16th, 21st, 24th.
Illinois.—3d, 9th, 13th, 17th, 18th.
Indiana.—2d, 3d, 5th, 6th, 24th.
Iowa.—1st, 2d, 3d, 5th, 9th, 10th, 15th, 18th, 19th, 20th, 21st, 23d.
Kansas.—2d, 8th, 16th.
Kentucky.—24th.
Maine.—3d, 4th, 19th.
Maryland.—2d.
Massachusetts.—4th, 6th, 14th, 15th, 17th.
Michigan.—4th, 9th, 10th, 18th, 20th, 24th, 27th, 28th.
Minnesota.—5th, 13th, 14th, 15th.
Missouri.—18th.
Nebraska.—16th, 26th.
Nevada.—22d.
New Jersey.—2d, 9th, 15th.
New York.—3d, 4th, 6th, 9th, 10th, 16th, 17th, 18th, 22d, 24th.
North Carolina.—27th, 28th.
Ohio.—3d, 9th, 10th, 17th, 18th, 22d, 27th, 28th.
Oregon.—15th, 23d, 24th.
Pennsylvania.—4th, 10th, 14th, 24th, 25th.
South Carolina. —10th, 24th, 27th.
Tennessee.—1st, 6th, 9th, 13th, 16th, 21st, 24th.
Texas.—16th, 20th, 28th.
Vermont.—3d, 4th, 11th, 15th.
Virginia.—1st, 2d, 4th, 6th, 17th, 21st, 24th, 27th.
Washington Territory.—21st, 24th.
Wisconsin.—3d, 19th, 20th, 24th, 26th.
Wyoming.—4th, 7th, 17th, 23d, 26th, 27th.

LUNAR HALOS.

Lunar halos were observed in the various states and territories, as follows:

Alabama.—16th.
Arizona.—7th, 15th, 17th to 23d.
Arkansas.—13th.
California.—8th to 12th, 15th, 16th, 19th, 20th.
Colorado.—11th, 13th, 15th, 16th, 22d.
Connecticut.—17th, 18th.
Dakota.—9th, 11th to 16th, 18th, 21st, 22d.
District of Columbia.—16th, 17th, 18th, 20th, 21st.
Florida.—9th, 14th, 15th, 17th.
Georgia.—16th.
Illinois.—2d, 3d, 8th, 9th, 13th, 15th to 18th.
Indiana.—9th, 10th, 13th, 15th, 18th, 20th.
Iowa.—8th, 9th, 10th, 14th, 16th, 17th, 18th.
Kansas.—1st, 8th, 11th, 12th, 14th, 16th, 17th.
Kentucky.—13th, 14th, 16th.
Louisiana.—25th.
Maine.—14th, 17th, 18th, 19th.
Maryland.—16th, 17th.
Massachusetts.—14th, 17th, 18th, 19th.
Michigan.—9th, 10th, 12th, 14th, 15th, 17th, 18th.
Minnesota.—12th, 13th, 14th.
Missouri.—13th, 16th, 17th, 18th.
Montana.—15th.
Nebraska.—8th, 10th, 12th, 14th to 18th.
Nevada.—10th.
New Hampshire.—17th.
New Jersey.—14th, 16th, 17th, 20th.
New Mexico.—17th.
New York.—10th, 11th, 14th, 17th, 18th, 19th.
North Carolina.—16th, 17th.
Ohio.—8th, 9th, 11th, 13th, 17th, 18th, 19th, 21st, 24th.
Oregon.—11th, 12th, 13th, 16th.
Pennsylvania.—9th, 10th, 14th, 16th, 17th, 18th, 21st, 26th.
South Carolina.—9th, 16th, 21st, 26th.
Tennessee.—9th, 10th, 13th to 17th, 24th.
Texas.—1st to 16th, 19th, 20th, 21st, 25th.
Utah.—14th.
Vermont.—17th, 18th.
Virginia.—9th, 10th, 11th, 14th, 16th, 24th.
Washington Territory.—10th, 13th, 14th, 15th, 17th.
West Virginia.—9th, 14th.
Wisconsin.—14th, 16th, 17th.
Wyoming.—14th, 15th, 16th, 23d, 24th.

The phases of the moon during February were: new moon, 3d, 10.06 p. m.; first quarter, 11th, 9.38 p. m.; full moon, 18th, 1.06 p. m.; last quarter, 25th, 0.03 p. m.; apogee, 2d, 5.02 a. m.; perigee, 17th, 9.0 p. m.

MIRAGE.

Webster, Dakota, 8th.
Marquette, Nebraska, 1st, 8th, 10th to 14th.
Galveston, Texas, 7th.
Fort Grant, Arizona, 11th, 12th, 15th, 16th, 18th.

MISCELLANEOUS PHENOMENA.

SUN SPOTS.

Prof. David P. Todd, director of the Lawrence Observatory, Amherst, Massachusetts, furnishes the following record of sun spots for February, 1886:

Date—February, 1886. Standard time.	No. of new.		Disappeared by solar rotation.		Reappeared by solar rotation.		Total No. visible.		Remarks.
	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	
1, 4 p. m...	0	5	0	0	0	0	1	10‡	
5, 1 p. m..	1	3	0	0	.....	.....	2	13‡	
8, 8 a. m....	1	12‡	0	0	0	0	3	25‡	One large spot.
9, 5 p. m....	1	10‡	0	5‡	0	0	4	30‡	Do.
14, 10 a. m....	1	10‡	.....	.....	0	0	4	35‡	Do.
15, 4 p. m....	0	0	0	10‡	0	0	2	15‡	
16, 3 p. m....	0	0	0	5‡	0	0	2	10‡	
17, 3 p. m....	1	3	2	10‡	1	3	1	3	
22, 12 m	1	5‡	0	0	0	0	2	10‡	
24, 10 a. m....	0	0	0	0	0	0	0	0	
27, 11 a. m....	1	5‡	0	0	0	0	1	5‡	
28, 5 p. m....	3	35‡	0	0	2	20‡	4	40‡	

Faculæ were seen at the time of every observation. ‡ Approximated.

Mr. H. D. Gowey, of North Lewisburg, Champaign county, Ohio, reports having observed sun spots on the following dates: 1st, 3d, 4th, 8th, 9th, 18th, 20th, 22d, 24th, 26th.

The Signal Service observer at Pittsburg reports, in reference to sun spots, as follows: About 7 a. m. of the 8th a large spot was noticed on the sun's disk, the smoke in the atmosphere acting in the place of smoked glass; on the morning of the 9th the spot had moved a little to the right; its position was then near the centre of the sun's disk. Prof. J. E. Keeler, of the Allegheny Observatory, also observed the spot on the 9th, and says in reference thereto: "The large sun spot is near the centre of the sun's disk; it is somewhat oval in shape, with a bridge projecting inward near one end; the largest diameter of the umbra is about 23″, corresponding to a linear distance of about ten-thousand miles on the surface of the sun." The spot was again observed at 8.30 a. m. of the 10th.

SUNSETS.

The characteristics of the sky, as indicative of fair or foul weather for the succeeding twenty-four hours, have been observed at all Signal Service stations. Reports from one hundred and sixty-six stations show 4,646 observations to have been made, of which five were reported doubtful; of the remainder, 4,641, there were 4,090, or 88.1 per cent., followed by the expected weather.

EARTHQUAKES.

The supposed earthquake shock reported to have occurred in the western part of Connecticut at 2.20 a. m. of the 3d was

probably caused by the explosion of a dynamite magazine at Fordham, Westchester county, New York.

The New York "Herald" of February 4th, in an account of the reported earthquake, states:

If it (the earthquake) was really caused by the explosion of the powder house it goes to show that the jar and the shock of the explosion were felt about eighty-five miles distant, or else that the shock and the earthquake must have been coincident or within a few minutes of each other. Many near-by localities also report a similar experience in the way of shock and vibration characteristic of an earthquake.

The following is from the report of the "Alabama Weather Service" for February, 1886:

A slight shock of earthquake occurred at 8 p. m. of the 4th in the western and northern portions of Alabama. The observer at Valley Head has the following to say in regard to this shock: "At 8 p. m. of the 4th there was a perceptible shock of earthquake felt in this vicinity; it moved from west to east in a horizontal or oblique wave. The disturbance was a mere tremor accompanied by a rumbling noise like distant thunder; the intensity of the force was sufficient, however, to rattle windows, dishes, etc., in the neighborhood. It was still stronger six or eighteen miles east of this point." Newspaper accounts state that this wave was quite perceptible in western and southwestern parts of Alabama.

The following is an extract from the Mobile, Alabama "Daily Register," of February 17, 1886, in reference to an earthquake that occurred in Sumter, Marengo, and Choctaw counties, Alabama, on the morning of the 13th:

The earthquake seemed to have followed the bed of the Tombigbee River for thirty-two miles from Moscow, fifteen miles below Demopolis, in Sumter county, to Tompkins' Bluff, in Marengo county. The shock was felt on both sides of the river but does not appear to have penetrated the interior at all. It was preceded by a rumbling noise like the discharge of heavy cannon in the distance, and immediately followed by a trembling of the earth. In general, the development and end of the earthquake was everywhere the same. First came the explosion, then the heaving of the earth, the swaying of trees, creaking of timber, and the crash of falling bodies. The movement was over almost as soon as its presence was realized. As far as can be learned, no one was injured, and but little damage was done. At Moscow the earth rose up a half a foot and as suddenly subsided; at Beckley's Landing, Marengo county, the shock was heavy but of short duration; at Rembert's Landing, in the same county, houses were rocked up and down and the beams cracked, dishes were thrown violently from shelves, and chairs and tables overturned; at Oak Chia, Choctaw county, the earth moved sideways and returned to its place, trees were shaken, cattle thrown from their feet, and people found great difficulty in maintaining an upright position. Similar reports were received from Tompkin's Bluff.

Prof. C. J. Rockwood, jr., Princeton, New Jersey, furnishes the following in reference to the earthquake that occurred in Alabama on February 13th:

A slight shock of earthquake was felt along the Tombigbee River in Sumpter, Marengo, and Choctaw counties, Alabama, alarming the inhabitants, but doing little damage.

The newspaper accounts that "the ground heaved up a foot" and "cattle were thrown from their feet" are evidently exaggerations, as it is stated in the same sentence that "no one was hurt."

FOREST AND PRAIRIE FIRES.

Fort Elliott, Texas: prairie fires occurred in the vicinity of this station on the 17th, 18th, and 19th, during which seventy-five thousand acres of land were burned over.

Prairie and forest fires have also been reported from the following stations:

Birmingham, Alabama, 18th to 24th.
Cedar Keys, Florida, 22d, 23d, 24th.
Limona, Florida, 7th, 10th, 12th to 16th, 21st.
Stateburg, South Carolina, 21st.
Midland, Texas, 13th.
Yankton, Dakota, 22d.
Fort Shaw, Montana, 22d.
Fort Reno, Indian Territory, 15th, 18th, 19th, 20th, 22d, 25th, 26th, 27th.
Fort Sill, Indian Territory, 10th, 11th, 17th, 19th, 21st.
Fort Selden, New Mexico, 8th.

METEORS.

Archer, Alachua county, Florida: a large meteor, about 2° in diameter, moving slowly, was observed at 11.30 p. m. of the 1st; it was first seen near Aldebaran, and exploded with a dull report near Canis Major; the light of the meteor was so intense as to illuminate the interior of dwellings.

Windsor, Shelby county, Illinois: a meteor was observed in the west at 7.30 p. m. of the 3d at an altitude of about 45°; it moved rapidly in a southwesterly direction, leaving a bright trail, and remained visible for four or five minutes (?) [probably seconds].

Northport, Leelenaw county, Michigan: a brilliant meteor was observed at 9.30 p. m. of the 3d; it started from the southwest at an altitude of about 60°, and exploded when near the earth.

Marquette, Hamilton county, Nebraska: a bright meteor of a greenish color was observed in the southwest at 9.30 p. m. of the 4th.

Monticello, Jones county, Iowa: a meteor was observed at 3.20 a. m. of the 5th, at an altitude of 60°, moving from northwest to southeast; it had the appearance of a large bolt about a yard long and three or four inches in diameter, the nucleus being somewhat larger.

Fort Buford, Dakota: a meteor of a bright white color was observed at 11.20 p. m. of the 6th; it started from an altitude of about 80°, moved in a westerly direction, and disappeared at an altitude of 20°.

Fort Buford, Dakota: at 7.46 a. m. of the 12th a meteor was observed to start from a point near the zenith and move in a direction a little south of west; during its flight it increased in brilliancy and was visible for about two and a half seconds; it disappeared at an altitude of about 70°.

Sacramento, California: a meteor of intense white color was observed at 8.27 a. m. of the 13th, moving from east to west, leaving a short trail.

Mr. Y. R. Visser, 2d officer of the s. s. "Leerdam," reports that at 10.30 p. m. of the 23d, when in about latitude 47° N., longitude 44° W., a brilliant meteor was observed, remaining visible for a couple of minutes. The light was so intense as to illuminate the entire horizon.

Nicolaus, Sutter county, California: a meteor was observed at 8.02 p. m. of the 24th, moving slowly, with an upward curve, from immediately under Polaris; it took a northeasterly course, and bore east by south when it disappeared. It was visible three or four seconds.

Monticello, Jones county, Iowa: a brilliant meteor was observed at 3.10 a. m. of the 26th, moving from northwest to southeast and leaving a brilliant trail; it burst at an altitude of 60°.

Meteors were also reported in the various states and territories, as follows:

Arizona.—Yuma, 27th.
California.—College City, 6th, 10th.
Connecticut.—Bethel, 1st.
Dakota.—Vermillion, 20th.
Florida.—Manatee, 20th to 24th.
Illinois.—Charleston, 21st; Eberle, 8th.
Indiana.—Terre Haute, 1st, 8th.
Iowa.—Davenport, 21st.
Kansas.—Fort Scott, 4th; Ottawa, 20th.
Maine.—Bar Harbor, 8th, 24th.
Maryland.—Woodstock, 22d.
Massachusetts.—Taunton, 8th.
Ohio.—Tiffin, 11th.
Tennessee.—Riddleton, 4th.
Texas.—San Antonio, 5th.
Wisconsin.—Manitowoc, 27th.
Wyoming.—Fort Bridger, 20th, 28th.

DROUGHT.

The Signal Service observer at Indianola, Texas, reported on the 12th, that owing to the dry weather stock were suffering for water.

POLAR BANDS.

Colorado.—Montrose, 15th.
Florida.—Archer, 3d, 4th, 5th, 12th, 26th.

Iowa.—Fort Madison, 3d.
Kansas.—Ninnescah, 6th.
New Jersey.—Morristown, 16th.
New York.—Haine's Falls, 3d.
Ohio.—Yellow Springs, 23d, 24th; Napoleon, 3d; Wauseon, 3d, 4th, 18th.
South Carolina.—Stateburg, 10th, 16th.
Tennessee.—Nashville, 16th, 24th.
Texas.—El Paso, 7th, 15th, 27th.
Virginia.—Wytheville, 4th, 5th, 16th, 17th, 24th; Dale Enterprise, 24th.
Wisconsin.—Prairie du Chien, 21st, 22d.
Wyoming.—Fort Bridger, 9th, 10th.

SAND AND DUST STORMS.

Yuma, Arizona, 14th.
Fort McDowell, Arizona, 22d.
Fort Stockton, Texas, 14th.
El Paso, Texas, 9th, 14th.
Lava, New Mexico, 14th.
Walla Walla, Washington Territory, 23d.

WATER-SPOUTS.

Captain Robert Bayley, of the ship "Reporter," states that he observed numerous water-spouts on the 5th and 6th, which were attended by squalls of rain, hail, and snow. When first observed on the 5th the ship's position was latitude 36° 25′ N., longitude 73° 0′ W.

MIGRATION OF BIRDS.

Geese flying northward.—Cahuenga, California, 1st, 9th; Indianola, Texas, 3d, 23d; Tatoosh Island, Washington Territory, 5th, 9th; San Rafael, California, 7th; Stockham, Nebraska, 8th; Yates Centre, Kansas, 9th, 15th, 18th; Knightstown, Indiana, 11th; Fort Madison, Iowa, 13th, 28th; Westmoreland, Kansas, 14th; Elk Falls, Kansas, 15th; Yutan, Nebraska, 17th, 20th, 25th; Swanwick, Illinois, and Wellington, Kansas, 18th; Ninnescah, Kansas, 19th, 20th; Allison, Kansas, 19th to 22d; Fort McDermitt, Nevada, 20th; Fairbury, Nebraska, 21st; North Platte, Nebraska, 22d; Saint Louis, Missouri, 23d; Keokuk, Iowa, 24th; Salina, Kansas, 25th; Sacramento, California, and Cape Henlopen, Delaware, 28th.
Geese flying southward.—Fort Scott, Kansas, 12th; Cairo, Illinois, 18th; Fort Madison, Iowa, 24th, 27th.
Ducks flying northward.—Stockham, Nebraska, 8th; Westmoreland and Elk Falls, Kansas, 14th; Yates Centre, Kansas, 17th, 21st; Yutan, Nebraska, 19th, 23d; Indianola, Texas, 22d.
Ducks flying westward.—Yuma, Arizona, 1st; Yates Centre, Kansas, 18th.

Meteorological record of voluntary observers and Army post surgeons, February, 1886.

The maximum and minimum temperatures at stations marked thus (*) are from readings of other than standard instruments.

Stations.	Temperature. Maximum.	Minimum.	Mean.	Rainfall.
Alabama.	°	°	°	*Inches*
Birmingham *	65	10	42.5	2.59
Greensborough	75	14	48.0	5.34
Mount Vernon B'ks	73	18	50.5	2.37
Prattville	87	20	43.7	4.91
Arizona.				
McDowell, Fort	85	32	57.2	1.54
Verde, Fort	78	24	49.6	0.96
Tucson				0.36
Arkansas.				
Lead Hill *	73	—11	36.2	2.61
Mount Ida	70	10	38.2	3.00
British Columbia.				
New Westminster	52	34		4.92
California.				
Alcatraz Island	68	40	54.2	0.15
Anderson *	66	33	51.8	0.38
Angel Island	79	39	57.0	0.12
Benicia Barracks	66	41	54.1	0.07
Bidwell, Fort	64	21	42.8	1.22
Blue Lake	71	27	49.5	6.25
California—Cont'd.				
Cahuenga				1.21
College City	70	32		0.04
Gaston, Fort	75	26	49.8	5.29
Mason, Fort	71	44	57.3	trace.
Murietta *	80	31	51.2	0.48
Nicolaus *	74	38	55.0	0.49
Oakland	67	40	54.6	0.30
Oroville *	70	44	57.1	0.36
Poway *	83	42	56.0	2.64
Presidio of San F	73	38	54.5	0.10
Princeton *	75	34	53.8	0.17
Sacramento *	74	37	53.0	0.35
Salinas	73	38	52.6	1.47
Santa Barbara	70	45	59.6	1.19
San Rafael	78	32	54.5	0.38
Susanville	62	27	40.2	0.62
Colorado.				
Colorado Springs	66	3	35.8	0.30
Lyon, Fort	70	10	38.8	trace.
Pueblo	73	4	39.5	0.42
Salida				0.17

Meteorological record of voluntary observers, etc.—Continued.

Stations.	Temperature. Maximum.	Minimum.	Mean.	Rainfall.
Connecticut.	°	°	°	*Inches*
Bethel				5.74
Hartford	54	— 8	24.1	6.16
North Colebrook *	54	—21	18.5	2.93
Southington	56	—10	24.9	5.47
Voluntown				11.25
Dakota.				
Abr. Lincoln, Fort	62	—27	15.1	0.70
Meade, Fort	68	—16	30.6	0.67
Pembina, Fort	47	—38	1.1	4.59
Randall, Fort	65	—21	26.5	0.32
Richardton *	50	—22	16.4	1.00
Sisseton, Fort	54	—36	12.1	0.65
Sully, Fort	66	—19	25.5	0.17
Totten, Fort	45	—35	7.1	0.67
Vermillion *	60	—20	24.1	0.59
Webster	61	—24	18.1	1.93
Yates, Fort	63	—24	18.4	0.22
District of Columbia.				
Distributing Res'r *	66	— 2	32.0	3.72
Kendall Green	64	— 4	31.0	2.51
Receiving Res'v'r *	64	— 4	30.9	3.20
Rock Creek Bridge *	67	0	35.1	
Florida.				
Archer *	78	23	52.6	1.57
Limona *	84	32	64.5	0.94
Manatee *	82	33	58.9	0.55
Meade, Fort				0.25
Merritt's Island	78	38	60.2	0.45
Saint Augustine, Ft.	77	26	53.0	3.32
Tallahassee *	72	18	49.0	1.60
Georgia.				
Athens	69	10	41.8	2.51
Forsyth *	76	13	47.4	2.20
Milledgeville	70	13	44.5	1.56
Quitman *	72	21	51.6	2.10
Idaho.				
Boise Barracks	65	19	42.3	0.38
Cœur d'Alene, Fort	58	15	37.6	0.89
Illinois.				
Anna *	59	— 7	33.8	2.38
Bloomington	52	—17		1.43
Bunker Hill	57	—12	29.6	1.33
Collinsville	58	— 9	31.4	1.59
Charleston *	55	—14	27.5	1.04
Geneseo *	50	—22	22.3	1.98
Mattoon *	58	—11	30.0	1.10
Pekin *	50	—20	25.7	3.65
Peoria	52	—15	29.2	1.86
Riley	42	—21	19.9	1.61
Rockford *	44	—20	20.9	3.40
South Evanston	48	—15		2.25
Swanwick	54	— 6	29.8	1.31
Sycamore	48	—17	21.2	1.85
Windsor	54	—12	27.7	1.22
Indian Territory.				
Reno, Fort	69	— 9	38.8	1.25
Supply, Fort	74	— 6	37.4	0.40
Indiana.				
Fort Wayne *	57	— 3	29.5	0.87
Guilford *	55	— 6	28.3	1.68
Jeffersonville	59	— 4	30.9	2.16
Knightstown	56	—12	27.4	0.69
Lafayette	55	—15	20.2	1.32
LaGrange	52	—13	23.8	1.06
Laconia	60	— 7		2.73
Mauzy	55	—16	23.0	1.14
Spiceland	54	—11	26.7	1.01
Sunman *	54	—13	28.0	1.69
Terre Haute *	54	— 4		1.20
Vevay	60	— 6	30.6	1.51
Iowa.				
Bancroft	44	—32	15.7	0.24
Cedar Rapids *a* *	48	—24	21.7	0.27
Cedar Rapids *b* *	46	—33	21.6	
Clinton *	49	25		1.91
Cresco	39	—30	14.2	0.95
Des Moines	53	—29	22.0	
Independence *	41	—21	19.2	0.80
Logan		—34	22.0	0.30
Fort Madison	52	—23		0.90
Manchester	45	—20	20.0	1.09
Monticello *	46	—24	19.8	1.31
Mount Vernon *	51	—26	21.4	
Muscatine	48	—21	21.2	1.43
Oskaloosa *a* *	52	—23	21.9	0.35
Oskaloosa *b* *	52	—23		
West Union	42	—26	17.5	0.88
Kansas.				
Allison	67	0	33.8	0.65
El Dorado	63	— 3	32.7	
Elk Falls		— 8		1.56
Emporia *	62	— 8	34.1	trace.
Fort Scott	65	— 8	34.4	1.27
Hays, Fort	68	— 6	31.8	0.44
Independence *	67	—10	33.5	1.48
Lawrence	62	— 7	31.6	0.56
Manhattan *a*	60	— 7	30.2	0.39
Manhattan *b*	69	— 7	31.2	0.25
Ninnescah *	63	— 2	32.8	1.47
Ottawa *	64	— 7	31.0	0.81
Riley, Fort	63	— 9	30.8	
Salina *	60	1	37.0	0.04
Kansas—Cont'd.				
Wakefield *	64	— 5	31.7	0.70
Wellington	66	—10	32.0	1.08
W. Leavenworth *	63	— 8		
Westmoreland *	59	—10	26.0	1.20
Wyandotte	62	—11	25.5	0.67
Yates Centre	66	— 8	31.0	1.62
Kentucky.				
Frankfort	59	—14	30.9	3.18
Richmond	60	—10	31.9	5.62
Louisiana.				
Grand Cotesu	73	27	54.1	1.37
Liberty Hill *	68	28	52.5	4.82
Luling *	75	26		3.25
Maine.				
Bar Harbor	48	—12		
Buckfield *	58	—16		5.22
Cornish *	47	—11	18.9	6.00
Gardiner	46	—10	20.6	7.25
Kent's Hill	48	—15	17.4	6.60
Orono *	50	—21	18.3	5.42
Maryland.				
Cumberland	52	— 6	29.9	1.83
Emmittsburg	56	— 4	28.0	4.52
Fallston *	55	— 6	29.7	5.96
Great Falls *	65	— 2	29.2	2.79
McDonogh	62	— 8	34.0	3.29
McHenry, Fort	64	— 1	31.0	3.28
Woodstock	63	— 7	28.7	4.79
Massachusetts.				
Amherst *a*	49	— 6	25.2	4.36
Amherst *b*	52	—11	23.1	3.94
Blue Hill Obs'y	55	—10	23.2	8.29
Deerfield	49	—12	22.9	3.24
Dudley	60	—16	21.6	5.12
Fall River	55	— 5	27.8	11.17
Heath *	52	—18		
Mendon *	49	— 8	26.5	7.70
Milton	55	— 8	26.5	7.70
New Bedford	48	— 6	26.7	6.97
Princeton	46	—13	20.5	5.32
Somerset *	58	—12	27.2	8.70
Taunton	59	— 9	27.3	8.85
Worcester *	48	— 9	22.2	6.32
Westborough *	56	—10	26.5	6.28
Williamstown	54	—17	21.1	2.61
Michigan.				
Birmingham	45	—20		1.36
Brady, Fort	47	—39	12.1	4.04
Harrieville *	49	—27		2.15
Hudson	50	—26		0.18
Kalamazoo	50	— 9		1.64
Lansing	51	—18	22.4	1.64
Mottville *	52	—18		
Northport	42	—16		1.68
Pentwater	54	—26	22.0	2.85
Thornville	49	—11	22.8	1.09
Traverse City *	50	—30		2.51
Minnesota.				
Minneapolis	46	—29	14.3	0.55
Preston *	42	—38		
Snelling, Fort	48	—38	14.5	0.40
Missouri.				
Carthage	65	—10	35.6	
Central College *	58	—14	30.4	0.90
Centreville	85	—16		2.11
Conception *	52	—22	25.6	0.75
Frankford *	67	—14		1.16
Pierce City *	64	— 9	34.2	1.80
Springfield *	59	—10	33.0	3.43
Warrenton *	58	—16	28.5	
Montana.				
Assinaboine, Fort	63	—20	29.2	0.39
Ellis, Fort	66	—12	33.1	1.16
Keogh, Fort	57	—15	28.5	0.50
Missoula, Fort	51	5	33.3	0.49
Shaw, Fort	66	—21	35.4	1.04
Nebraska.				
Crete	63	—17	26.0	0.92
De Soto *	57	—23	24.1	0.41
Fairbury *	65			0.98
Fremont *	62	—23	22.3	0.46
Genoa	60	—17	24.5	0.39
Hay Springs *	63	— 5	29.2	0.93
Marquette *	50			0.69
Niobrara, Fort	78	—15	28.4	0.84
Robinson, Fort	71	— 5	33.7	0.57
Sidney, Fort	74	8	33.5	0.132
Stockham *	68			0.75
Sidney	72	10		
Yutan *	52	—20	25.0	0.64
Nevada.				
Carson City	68	20	42.2	0.28
Halleck, Fort	64	10	36.2	0.50
McDermitt, Fort	63	20	39.5	0.40
New Hampshire.				
Ashland				5.27
Belmont				4.61
Berlin Mills	49	—30	14.3	2.60
Bristol				4.41
Lake Village				4.72
Nashua	52	— 8	23.1	5.71
Wier's Bridge				4.49

Meteorological record of voluntary observers, etc.—Continued.

Stations.	Temperature. Maximum.	Minimum.	Mean	Rainfall.
N. Hampshire—Con.	°	°	°	*Inches*
Wolfborough	.....	.....	.....	5.40
Woodstock	.....	.....	.....	4.19
New Jersey.				
Beverly *	62	— 4	28.3	4.58
Clayton *	60	— 2	29.6	8.00
Dover *	60	— 7	25.7	5.02
Moorestown	64	— 4	27.5	6.02
Paterson *	58	0	28.5	5.42
Phillipsburg *	48	— 2	28.3	4.91
Princeton	61	— 5	27.4	4.59
Readington *	58	0	31.9	.....
South Orange *	52	— 2	28.2	4.60
Vineland	60	—10	31.0	5.94
New Mexico.				
Bayard, Fort	78	18	47.0	1.07
Gallinas Spring	67	25	.....	1.50
Puerto de Luna	69	14	41.1	0.71
Selden, Fort	80?	19	47.6	0.10
Union, Fort	69	7	30.4	trace.
Wingate, Fort	62	10	35.4	0.94
New York.				
Auburn	55	—11	25.4	3.03
Cooperstown *	50	—18	20.0	1.86
David's Island	56	— 4	26.8	3.25
Factoryville *	52	— 8	30.3	0.94
Haines Fall	.....	—16	19.3	.....
Humphrey *	49	—14	23.0	1.70
Ithaca	53	—10	24.2	.....
LeRoy	57	— 5	23.9	2.02
Madison Barracks	51	—32	17.1	2.12
Menand Station	46	—14	22.5	1.46
Mountainville	54	— 7	25.8	3.94
Niagara, Fort	49	—11	23.2	1.58
North Volney *	48	—17	20.7	2.25
Palermo *	49	—19	19.6	2.36
Palmyra *	51	— 4	.....	.....
Penn Yan	.....	.....	.....	1.06
Plattsburg B'ks	49	—21	18.5	1.22
Setauket	55	— 3	28.2	7.08
Syracuse	47	— 4	.....	.....
West Point	58	—10	25.3	4.24
White Plains	52	— 9	27.5	6.40
North Carolina.				
Chapel Hill	67	3	38.6	.....
Lenoir *	56	4	.....	0.18
Lincolnton	.....	.....	.....	1.90
Raleigh *	69	6	39.0	2.10
Reidsville *	63	5	35.6	0.24
Statesville *	62	4	39.5	2.74
Wake Forest *	68	3	40.4	2.35
Weldon *	68	7	38.2	2.10
Ohio.				
Cincinnati	68	— 2	31.4	1.65
Cleveland	56	— 6	26.7	1.77
Clyde	62	—10	.....	.....
College Hill *	72	—12	32.1	2.00
Garrettsville	56	—20	22.0	1.35
Fostoria *	66	— 8	26.2	1.05
Hiram	56	—12	23.1	1.56
Jacksonborough *	58	—12	26.8	1.51
Napoleon	58	— 8	27.5	0.47
North Lewisburg	60	—11	28.3	1.55
Ruggles *	54	— 8	24.9	1.00
Tiffin *	60	— 6	24.8	1.40
West Milton	62	—10	26.1	1.00
Wauseon	57	—18	25.0	0.84
Westerville	60	—10	2 .5	1.64
Yellow Springs	61	—13	28.2	2.36
Oregon.				
Albany *	64	32	46.4	3.34
Bandon *	58	30	43.6	5.66
East Portland *	60	36	.....	3.00
Eola *	60	30	43.4	1.94
Klamath, Fort	63	15	37.4	1.80
Pendleton	60	22	41.2	0.77
Pennsylvania.				
Altoona	55	3	32.0	0.87
Bethlehem *	55	— 4	28.1	4.68
Blooming Grove *	61	—12	24.4	3.20
Catawissa *	56	— 6	25.5	2.75
Drifton	59	—12	30.0	3.47
Dyberry *	50	—13	21.5	2.43

Stations.	Temperature. Maximum.	Minimum.	Mean.	Rainfall.
Pennsylvania—Con.	°	°	°	*Inches*
Easton	.....	.....	.....	5.28
Fallsington	63	— 5	27.8	5.67
Franklin *	50	—18	19.8	3.32
Germantown *	63	— 8	.....	0.97
Grampian Hills *	56	—14	22.8	1.90
Mahanoy Plane	54	6	28.6	3.59
Philipsburg *	55	0	26.0	.....
Quakertown *	55	— 4	.....	5.74
South Bethlehem *	59	9	30.4	4.41
Troy *	48	— 7	21.6	.....
Wellsborough *	50	—10	25.1	0.95
West Chester	62	— 5	27.2	6.22
Wysox	54	— 3	26.6	0.95
Zionsville	55	— 2	31.7	6.00
South Carolina.				
Aiken *	69	12	45.8	2.20
Kirkwood *	61	8	38.8	1.59
Pacolet *	58	12	39.6	2.34
Spartanburg	49	33	42.0	2.30
Statesburg *	68	14	44.7	1.46
Tennessee.				
Ashwood	63	— 8	27.5	2.89
Austin *	64	—22	35.0	4.79
Milan	61	—17	30.2	6.21
Paris *	57	—14	34.4	12.62
Texas.				
Austin *	85	25	54.8	2.18
Clark, Fort	93	29	58.4	1 20
Concho, Fort	87	17	50.8	0.80
Corsicana	.....	.....	.....	2.51
Huntsville *	82	23	.....	3.05
McIntosh, Fort	87	27	59.7	0.79
Midland	84	12	47.7	0.33
Ringgold, Fort	98	33	62.5	1.58
New Ulm	87	23	54.2	1.65
Silver Falls	78	19	.....	trace.
Vermont.				
Brattleborough	52	—14	23.0	3.14
Burlington	50	—12	18.2	1.06
Charlotte *	48	—24	16.8	2.00
Dorset	54	—20	18.9	3.16
Lunenburg	46	—25	15.4	1.67
Newport *	46	—30	14.0	3.23
Post Mills Village *	44	—30	15.5	.....
Poultney	.....	—24	18.0	3.94
Strafford *	44	24	16.4	2.70
Stowe *	54	—24	.....	.....
Virginia.				
Accotink	68	— 4	32.6	4.95
Bird's Nest *	60	2	35.6	5.00
Bruington	.....	.....	.....	3.70
Dale Enterprise *	62	— 8	32.7	3.59
Marion *	57	—12	30.0	1.57
Monroe, Fort	66	1	36.6	3.30
Snowville *	59	— 5	.....	1.60
Summit	60	—10	32.3	.....
University of Va	63	— 7	32.5	3.06
Variety Mills	62	—16	32.6	4.02
Wytheville	62	— 7	33.3	1.53
Washington Territory.				
Bainbridge Island *	66	29	45.5	1.96
Kenewick *	72	16	.....	0.19
Pleasant Grove *	58	14	.....	0.30
Spokane, Fort	53	17	36.4	0.28
Tacoma *	59	30	43.5	2.29
West Virginia.				
Clarksburg *	66	4	.....	1.29
Helvetia *	62	—24	29.0	2.71
Parkersburg	64	—10	30.5	0.28
Wisconsin.				
Embarras *	50	—30	17.4	2.25
Evansville *	47	—20	23.0	.....
Madison	43	—21	19.7	2.35
Manitowoc	46	—22	21.2	0.80
Neillsville *	45	—48	6.1	0.33
Prairie-du-Chien	49	—25	20.4	0.95
Wyoming.				
Bridger, Fort	50	5	31.4	0.60
Fred Steele, Fort	56	0	29.8	0.24
Laramie, Fort	65	7	35.5	0.07
Washakie, Fort	69	2	35.8	0.10

NOTES AND EXTRACTS.

The following is an extract from the February, 1886, report of the "Alabama Weather Service," under direction of Prof. P. H. Mell, jr., Auburn:

This month has presented no special features requiring marked attention; the season, however, has been excellent for farming operations and the fruit trees have been much benefited by the favorable weather. The temperature was 5°.6 below the average.

There were three cold waves that swept over the state during the month, all of which were accurately predicted by the Chief Signal Officer, and timely warnings were given to all the telegraph stations throughout the territory belonging to the "Alabama predicting system."

The precipitation was also small and was 1.61 inches below the average, but the distribution was very uniform. A fall of snow was reported by some stations, but too small to be of much importance.

The following items from the observers will be read with interest: Birmingham reports that on the 25th the weeping willows and lilacs were putting forth leaves; Trinity, however, states that the trees have not yet given signs of budding and that very little has been done in the way of farming. At Tuscombia the bulbus roots began to show their green tops above the surface of the earth on the 26th; the maple and some other trees were also budding on that date. Centre reports as follows: "On the 11th there was a considerable thunderstorm throughout the country between 6 and 7 p. m., accompanied by vivid lightning and a high wind. At Leesburg, five miles from here, it had some of the characteristics of a tornado. It took off the top of a large frame storehouse and crushed in the sides; the rafters were carried nearly a quarter of a mile and some of them were driven endways several feet into the ground. The storm was from the southwest and continued fifteen or twenty minutes. Leesburg was the first place in the county where the storm struck, and no damage was reported elsewhere. At the time of the storm the thermometer was 56° and its average for the day was 55°."

Greensborough states that the season is very backward in that part of the state. The first crocus and white hyacinth bloomed on the 9th; elms on the 14th. The first moths were noticed flying around on the evening of the 14th. No leaf buds were detected at the close of the month.

This month closes the meteorological year of the Alabama Weather Service; in some respects the year has been noted. For instance, the spring was very backward. An unusual amount of precipitation occurred in September, and there were tornadoes in Dallas on the 30th of April, and in Decatur, and near Selma, on the 6th of November. Exceptional cold weather occurred from the 8th to the 14th of January. Tuscaloosa shows a greater precipitation than Mobile, which is something remarkable, when we consider that Mobile is in the region of heavy rainfalls. Union Springs is the driest spot in the state.

The last damaging frost for the spring of 1885 occurred on the 13th of April. The first frost in the fall was on the 22d of October.

The prevailing direction of the wind was northwest.

State summary.

Mean temperature, 43°.6; highest temperature, 86°, at Prattville, on the 24th; lowest temperature, 4°, at Gadsden, on the 5th; range of temperature, 82°; greatest monthly range of temperature, 72°, at Prattville; least monthly range of temperature, 40°, at Russellville and Marion; mean daily range, 16°; greatest daily range of temperature, 49°, at Carrollton, on the 23d; least daily range of temperature, 1°, at Livingston, on the 8th; Selma on the 27th; Russellville, on the 12th; and Tuscumbia, on the 12th.

Mean depth of rainfall, 3.18 inches; mean daily rainfall, 0.114; greatest depth of monthly rainfall, 5.34 inches, at Newton; least depth of monthly rainfall, 1.20 inches, at Jacksonville; greatest daily rainfall average for state, 2.16 inches, on the 3d; greatest daily local rainfall, 2.54 inches, at Oswichee, on the 27th.

Average number of days on which rain fell, 5; average number of cloudy days, 9; average number of fair days, 8; average number of clear days, 11.

Warmest days, 14th and 23d; coldest days, 4th and 5th.

Prevailing direction of wind, northwest.

Annual summary.

Average temperature of each month for the whole year.—March, 49°.8; April, 64°.0; May, 69°.7; June, 78°.5; July, 80°.5; August, 78°.9; September, 73°.1; October, 60°.1; November, 52°.5; December, 44°.1; January, 37°.9; February, 43°.6.

Average temperatures for the seasons.—Spring, 61°.2; summer, 79°.3; autumn, 61°.9; winter, 41°.9. For North Alabama: spring, 58°.0; summer, 77°.6; autumn, 59°.5; winter, 38°.2. For Central Alabama: spring, 61°.9; summer, 79°.6; autumn, 62°.5; winter, 42°.2. For South Alabama: spring, 63°.8; summer, 80°.0; autumn, 64°.7; winter, 45°.2.

Average precipitation of each month for the whole state (in inches).—March, 2.99; April, 4.15; May, 6.21; June, 3.88; July, 4.24; August, 3.76; September, 5.32; October, 2.50; November, 4.41; December, 2.87; January, 6.63; February, 3.18.

Average precipitation for the seasons (in inches).—North Alabama: spring, 10.63; summer, 12.64; autumn, 13.89; winter, 12.34; total, 49.50. Central Alabama: spring, 13.21; summer, 10.92; autumn, 11.70; winter, 14.29; total, 50.12. South Alabama: spring, 16.27; summer, 12.09; autumn, 11.36; winter, 11.41; total, 51.13.

The following is an extract from the February, 1886, "Weather Review of the Illinois Weather Service," under direction of Mr. Charles F. Mills, of the Illinois Department of Agriculture, Springfield:

The "Review" contains a general summary of the conditions which prevailed over Illinois during the month of February, 1886, based upon the reports received from the Signal Service and voluntary observers reporting to the Illinois Department of Agriculture.

The state covers such an extended area from north to south (385 miles) that it has been found advisable to divide the same and follow the judicial divisions, which include the following territory, viz., the northern division extends from 42° 30′ to about 40° 31′; the central division extends from about 40° 31′ to about 39°; the southern division, from about 39° to 36° 51′.

Atmospheric pressure.—The highest barometer reported at the twenty-one

stations during the month of February, was on the 4th, at fifteen stations, and on the 2d, 3d, 5th, 6th, 10th, 18th, and 23d, at one station each. The lowest barometer reported at the twenty-one stations during the month was on the 13th, at sixteen stations, and on the 9th, 11th, 20th, 21st, and 25th, at one station each. The highest barometer, as expressed in inches and hundredths, reported in February during the past five years was as follows: 1882, 30.594; 1883, 30.850; 1884, 30.730; 1885, 30.700; 1886, 30.873. The lowest barometer in February for the same years was as follows: 1882, 28.870; 1883, 29.030; 1884, 28.920; 1885, 29.134; 1886, 28.630. The mean barometer for the same month was as follows: 1882, 29.857; 1883, 30.109; 1884, 30.021; 1885, 30.083; 1886, 29.925.

Temperature.—The mean temperature of February, 1886, was lower than the average of the same month at all except four of the stations from which observations have been received for a term of years. The mean temperature of the month was above the normal at the following stations: At Aurora, Kane county, the mean temperature of February, 1886, was 3°.96 above the mean of the month for a term of years; Prairieville, Lee county, 2°.30; Griggsville, Pike county, 3°.03; and Fairfield, Wayne county, 4°.04. The mean temperature of February, 1886, was below the average of the month at the following stations: Marengo, McHenry county, 2°.10 below; Sycamore, DeKalb county, 0°.49; Chicago, Cook county, 0°.09; Davenport, Iowa, 3°.63; Peoria, Peoria county, 0°.05; Keokuk, Iowa, 3°.05; Springfield, Sangamon county, 0°.76; Mattoon, Coles county, 1°.22; Bunker Hill, Macoupin county, 4°.61; Palestine, Crawford county, 1°.57; Greenville, Bond county, 2°.29; Collinsville, Madison county, 3°.80; Saint Louis, Missouri, 0°.37; Swanwick, Perry county, 3°.20; McLeansborough, Hamilton county, 0°.23; Anna, Union county, 4°.32; Golconda, Pope county, 2°.59; Cairo, Alexander county, 4°.82. The average mean temperature of February for the last twelve years was 29°.27, which was 1°.91 higher than the mean temperature for February, 1886. The mean temperature of February, 1876, 1877, 1878, 1879, 1880, 1882, and 1884, was higher than that of February, 1886; and February, 1875, 1881, 1883, and 1885, was colder than February, 1886. The highest mean temperature for February during the past twelve years was 30°.59, in 1882, and the lowest, 16°.15, in 1875.

The highest temperature of the month was reported on the 10th, at twenty-two stations; on the 22d, at fourteen; on the 24th, at eleven; on the 23d, at six; on the 8th and 9th, at four each; on the 11th, 13th, and 18th, at two each; and on the 12th and 15th, at one station each. In the northern division of the state the highest temperature was reported on the 22d at seven stations; on the 10th, at five; on the 24th, at four; on the 9th, at two; and on the 8th, 12th, and 18th, at one each. In the central division the highest temperature reported was on the 22d, at seven stations; on the 10th, at four; on the 8th, 23d, and 24th, at two each; and on the 9th, 13th, and 18th, at one station each. In the southern division the highest temperature noted was on the 10th, at thirteen stations; on the 24th, at five; on the 23d, at four; and on the 8th, 13th, and 15th, at one station each.

The lowest temperature in February, 1886, was reported on the 2d at six stations, on the 3d at twenty-seven, on the 4th at thirty-five, and on the 5th at two. In the northern division of the state the lowest temperature was reported at six stations on the 2d, at eleven on the 3d, at seven on the 4th. In the central division the lowest temperature was reported at ten stations on the 3d, and at twelve on the 4th. The lowest temperature in the southern division was reported on the 3d at six stations, on the 4th at sixteen, and on the 5th at two.

The highest temperature in February, 1886, was 63°.60, at Saint Louis, Missouri, on the 8th, and the lowest, —24°.00, at Cedarville, Stephenson county, on the 3d. The highest temperature noted in February for a term of years has been as follows: 1882, 76°; 1883, 78°; 1884, 69°; 1885, 72°; 1886, 63°.60. The lowest temperature noted for the same months during the years named was as follows: 1882, 2°; 1883, —22°; 1884, —12°; 1885, —33°; 1886, —24°.

The mean temperature of the state for the month of February during the past five years has been as follows: 1882, 39°.41; 1883, 26°.44; 1884, 30°.16; 1885, 18°.49; 1886, 27°.36.

Precipitation.—The precipitation in February, 1886, including melted snow, averaged but 1.78 inches at the forty-nine stations reporting precipitation, and was 1.10 inches less than the average February rainfall of the last twelve years. The February, 1886, rainfall was less than that of the corresponding month in nine years and exceeded it only in 1877 by 1.68 inches, in 1879 by 0.14 of an inch, and in 1885 by 0.49 of an inch. The rainfall was quite general over the state on the 10th, 11th, 12th, 24th, 25th, 27th, and 28th of February. No rain or snow was reported from any portion of the state on the 16th, 17th, 20th, 22d, and 26th. The average precipitation of the month at stations from which reports have been received for a term of years was less than the normal at twenty stations, and more than the normal at three.

The snowfall of the month occurred almost altogether on the 28th throughout the state, the amount falling on other days being so small as to be scarcely worth noting. The snow which was on the ground the first of the month, averaging 6.08 inches, almost entirely disappeared during the warm rains of the 10th, 11th, and 12th, and the ground remained bare until the 28th.

The following is an extract from a report furnished by Prof. F. H. Snow, of the University of Kansas, from observations taken at Lawrence, Kansas:

The temperature of this month was nearly of the average value, nine of the eighteen preceding Februarys having been colder, and nine of them warmer than the month just passed. The rainfall was less than half the average amount; the wind velocity was nearly normal and the cloudiness below the average.

Mean temperature.—The mean temperature was 31°.64, or 0°.60 below the February average; the highest temperature was 62°.00 on the 22d, and the lowest, 7°.00 below zero, on the 4th, giving a range of 69°.00. The temperature fell below zero on three days; the mean temperature at 7 a. m. was 24°.93; at 2 p. m., 39°.41; and at 9 p. m., 31°.11.

Precipitation.—The rainfall, including melted snow, was 0.56 inch, or 0.74 inch below the February average; rain or snow in measurable quantities fell on seven days. There was one thunder shower. The entire depth of snow was one inch.

State of the sky.—The mean cloudiness was 42.38 per cent., the month being 4.24 per cent. clearer than usual; the number of clear days was 14; half clear, 7; cloudy, 7; there were five entirely clear days and six entirely cloudy days; the mean cloudiness at 7 a. m. being 45 per cent.; at 2 p. m., 43.57 per cent.; and at 9 p. m., 38.57 per cent.

Winds.—The prevailing direction of the wind was southwest, and the total velocity 11,170 miles, or 212 miles above the February average; the highest velocity was forty-one miles per hour, on the 24th.

Relative humidity.—The mean relative humidity for the month was 73.6 per cent., the greatest being 100 per cent. on four days, and the least, 31.0 per cent. on the 17th.

The following meteorological summary and accompanying remarks are from the February, 1886, report of the "Indiana Weather Service," under direction of Prof. W. H. Ragan, of De Pauw University, Greencastle:

Districts.	Temperature.			Precipitation.	Winter of 1885-'86.		
	Highest	Lowest.	Monthly mean.		Mean temperature.	Rain and melted snow.	Total snowfall.
	°	°	°	*Inches.*	°	*Inches.*	*Inches.*
Northern counties	57	—18	26.1	1.03	24.7	7.82	16.1
Central counties	60	—16	27.2	1.45	26.7	7.76	20.9
Southern counties	62	—13	30.0	1.92	29.7	8.20	17.9
State	62	—18	27.8	1.47	23.7	7.93	21.6

Weather and precipitation.—The greater number of days were clear or fair, and the rains and snows were generally light. At eight stations, in the centre and south, an average of 8.1 days were clear, 7.0 fair, 12.9 cloudy, and 0.01 or more precipitation fell on 8.9.

Temperature.—The first five days were very cold; the 9th, 10th, 11th, 12th, quite warm, in general. The general result was somewhat below normal, but much higher than last year. The mean, for the month and winter, was —— below normal at Logansport; 2°.8 and 1°.6 below at Spiceland; 4°.0 and 3°.6 below at Indianapolis; 0°.0 and 1°.6 above at Connersville; 4°.4 below and 0°.1 above at Mauzy; 0°.4 below and 0°.2 above at Sunman; 0°.1 below and 0°.6 above at Worthington; 5°.3 and 2°.4 below at Vevay, and 3°.6 and 1°.6 below at Blue Lick; and for the state, 3°.1 and 1°.3 lower than in 1883; 5°.9 and 2°.2 lower than in 1884; 9°.5 and 4°.6 higher than in 1885, and 0°.1 and 0°.3 higher than the four-year normals. These winter normals are, however, probably much too low, the last four winters having been cold. The highest station mean was 32°.5, and winter, 32°.1, and lowest, 23°.8 and 23°.8; highest maximum, 62° and 62°; lowest minimum, —18° and —25°; state range, 80° and 87°; average station range, month only, 63°.6; greatest, 75°; least, 53°.

Precipitation (inches).—The precipitation was light and unevenly distributed through the month and over the state, varying from an aggregate of 13.55 (at twenty-six stations) on the 11th, to 0.01 or less on the 4th, 5th, 6th, 7th, 8th, 9th, 10th, 17th, 22d, 27th, and from 3.05 at Degonia Springs, to 0.50 at Fort Wayne. For the winter the range was from 12.61 at Marengo to 5.61 at Lafayette. For the month and winter the snowfall ranged from 10.0 and 42.8 to 0.5 and 12.0. The principal precipitation during the month fell on the 11th (13.55); 12th (5.78); 15th (7.22); 24th (4.55); 25th (10.51), in connection with low barometer areas of considerable energy. Principal snows fell on the 2d (south), 13th, 14th (north), 15th, 19th, 21st, 25th. 28th. Rain or snow, in some portion of the state, on twenty days. Total precipitation was below normal, for the month and winter, — and — at Logansport; 1.90 and 1.66 at Spiceland; 1.82 and 1.71 at Indianapolis; 1.42 and 4.11 at Vevay, and for the state was less 6.53 and 4.98 than in 1883; 3.95 and 3.09 than in 1884; 0.56 and 3.68 than 1885; 2.76 and 2.94 below normal. The snowfall appears to have been below normal.

The following is an extract from the February, 1886, report of the "Minnesota Weather Service," under direction of Prof. Wm. W. Payne, Carleton College, Northfield:

The average mean temperature of Minnesota, as deducted from reports from the several stations of the Minnesota Weather Service, is 13°.1; this is 12°.2 warmer than the preceding month of January, much warmer than February, 1885, and slightly above the average of that month, for the three preceding years, 1885, 1884, 1883. The difference in the average temperature for the month between the northern and southern parts of the state has been less than usual, the coldest station, Saint Vincent, in the extreme northwest, having an average of 4°.9, and La Crosse, in the extreme southeast, 21°.8, thus giving a

range of but 16°.9 between the coldest and warmest stations. The temperature has varied from about the normal in the southern part of the state to two degrees above the normal in the the Red River Valley and northern districts.

The warmest part of the state, as usual, has been the forest region in the east, and the southern part, east of the longitude of Mankato, and below the altitude of 1,000 feet.

The most important meteorological feature of the month was the cold term, with accompanying high pressure, which, beginning on the 1st in the Northwest, by the morning of the 2d had covered the entire state, and during its continuance produced the lowest temperatures for the month at all stations. A peculiarity of this cold term was that the lowest temperatures during its continuance were recorded in the southern part of the state, the lowest temperature at any one place, —40°.6, being noted at Carleton College Observatory, Northfield, on the morning of the 4th.

On the 5th the advance of a "chinook" wind, or warm wave, from the northwest, caused a rapid rise in the temperature and an exceedingly mild term which lasted until the 11th, and produced the highest readings of the month, generally, at all stations north of the latitude of Saint Paul. High temperatures were: Duluth, 55°.4, on the 10th; Saint Vincent, 49°.5, on 7th, and 43°.0, on the 8th; Grand Forks, 45°, on 6th and 7th, and 42°.0, on 23d; Crookston, 42°.0, on 7th and 8th; Moorhead, 50°.0, on 7th. From the 11th to 23d the weather was mild and variable, when, on the latter date, the approach of a cyclone or storm-centre from the northwest, with accompanying low pressure, was preceded by southerly gales and a rapid rise in temperature, during which the highest temperatures of the month occurred in the southern part of the state, as follows: La Crosse, 52°.0, on 24th; Mankato, 50°.0, on 24th; Bird Island, 50°.0, on 24th; and Red Wing, 46°.2, on same date. The passage of this low area to the east was followed in its wake by heavy northwesterly gales with following wind velocities: Northfield, northwest, thirty-six miles; Saint Paul, west, twenty-six miles; and Bird Island, the phenomenal velocity of sixty miles per hour, northwest, on 23d, 24th, and 25th. The largest monthly movements of wind, in miles, were: Bird Island, 12,280; Moorhead, 9,934; and Saint Vincent, 7,997. The least movements: Saint Paul, 4,791; Red Wing, 3,905. The average direction of the wind, was, as is common for a winter month, from the northwest.

Precipitation.—The precipitation, as is usual for a winter month in Minnesota, has been small, and, in contrast with January, quite evenly distributed throughout all parts of the state. It has been nearly all in the form of snow, though rain, at various times, has occurred in small amounts at all stations. The first decade of the month was without appreciable precipitation, but after the 11th snow in small quantities was incident to nearly every day. The largest amount at any one time was on the 27th and 28th, when a light snow storm was general throughout the state. The largest total fall for month was at Northfield, 9.8 inches, and Mankato, 8.8 inches. Light rain occurred at Saint Vincent on the 12th; Moorhead, 20th; Grand Forks, 20th; and Spring Valley, 18th. The depth of snow on the ground at the end of the month varied from 1 inch at Morris to 14 and 16 inches at Albert Lea and Northfield. In the western and northwestern part of the state the warm weather of the 5th to 11th melted nearly all the snow, and the ground was practically bare until covered by the light snows of the 27th and 28th. Though somewhat interfered with by thawing weather, logging operations have proceeded uninterruptedly, and it is probable that the lingering season will admit of nearly a full cut throughout the timber districts for the next season's supply.

The comparative absence of snow in western Minnesota and in Dakota makes it probable, provided the snows of March are light and so soon as the warm sun of the early spring thaws the ground a few inches, that seeding will begin and be completed at an earlier date than usual, a condition much to be desired as increasing the probability of an abundant harvest.

The following meteorological summary and accompanying remarks are from the February, 1886, report of the "Indiana Weather Service," under direction of Prof. H. A. Huston, of Purdue University, Lafayette:

Districts.	Temperature.			Average precipitation.
	Highest.	Lowest.	Monthly mean.	
	°	°	°	*Inches.*
Northern counties	57.0	—13.5	25.96	1.33
Central counties	59.7	—16.0	27.18	4.39
Southern counties	62.0	—13.0	28.13	7.55
State	62.0	—16.0	27.09	4.49

The mean temperature of the state for February was 0°.77 above that for the last three years; 5°.68 below the mean of fifteen years at Indianapolis; 3°.48 below the mean of twenty-six years at Logansport; 8°.81 below the mean of twenty-one years at Vevay; 1°.41 below the mean of thirty-two years at Spiceland; 3°.59 above the mean of six years at Mauzy; 7°.51 below the mean of eight years at Blue Lick; 2°.51 below the mean of four years at Worthington; and 0°.69 below the mean of seven years at this station. The mean temperatures at the various stations are below the normal, the amounts ranging from 0°.50 to 5°.25.

The mean precipitation for the state was 1.35 inches below the mean of the past three years; 2.06 inches below the mean of fourteen years at Indianapolis; 1.38 inches below the mean of twenty-one years at Vevay; 1.36 inches below the mean of three years at Spiceland; 2.91 inches below the mean of six years at Mauzy; 3.04 inches below the mean of five years at Blue Lick; 3.27 inches below the mean of four years at Worthington; and 2.57 inches below the mean of seven years at this station. The precipitation at the various stations ranged from 1.9 to 3.32 inches below the normal. The mean snowfall for the state is 0.4 inch below the mean of the past three years. The distribution of the snow was abnormal, there being three times as much in the southern counties as in the northern.

The following is an extract from the February, 1886, report of the "Missouri Weather Service," under direction of Prof. Francis E. Nipher, Washington University, Saint Louis:

The temperature of February has been 33°.0, or 2°.4 below the normal, and the rainfall has been 1.63, or 0.9 inch below the normal.

The extreme temperatures, —4° on the 3d and 58°.9 on the 8th, are ordinary temperatures. The temperature fell to, or below, zero on three days, viz., on the 2d, 3d, and 4th, and fell to, or below, 32° on nineteen days, while on five days (the first five of the month) it did not rise above 32°.

In the state the rainfall was less than one inch in the western and northern parts, and in a region immediately northwest of Saint Louis, bounded by a line running near Hannibal, Louisiana, Washington, Chamois, and Mexico. To the southeast the fall is greater, being about 2.5 inches in the southeast part of the state.

The lowest temperatures reported are: —20°, at Kirksville; —17°.7, at Keokuk; —18°, at Mexico and Steelville. The highest temperatures were 73°, at Pro Tem, Taney county; 68°, at Greenfield; and 66°, at Sedalia and Chamois.

Oregon reports: "The heavy snow which covered the earth during January melted, so that sleighing ended February 9th, after thirty-six days' continuance. The ground was not frozen much, and nearly all the water from the melting snow entered the earth. Wheat and grass are generally in good condition. The earth is now covered by three inches of snow, and more is falling."

Chamois: "The temperature for the month is only 0°.37 below the normal for the last fourteen years, but there has been a deficiency of precipitation of 2.66 inches below the average of the last eight years, the average for that time being 3.40 inches."

Houstonia: "Mock suns were seen on the 13th, 14th, and 17th, and also on the 3d, when they were accompanied by the upper contact arc of the halo of 46°. On the 24th the snow disappeared. The ground was frozen to the depth of about two feet, and not yet thawed out."

Pro Tem, Taney county: "Heavy snowfall of 17 inches on the 1st and 2d; the largest fall since 1856. Mean temperature of the winter, 33°.11, or 2°.76 below the average of the last four years."

Savannah: "Wheat was looking well when the snow left. Freezing and thawing has killed the tops somewhat, but the roots are all right yet. Peaches are killed as far as I have examined. Apples are all right. Ice has frozen during the winter to a depth of 18 inches. The ground was not much frozen, owing to the heavy snow."

Glasgow: "Ice moved out in the Missouri River on the 15th."

The following is an extract from the February, 1886, report of the "Nebraska Weather Service," under direction of Prof. Goodwin D. Swezey, of Doane College, Crete:

Cold waves and storms.—Five cold waves, the first a severe one, have been experienced during the month; the first brought the lowest temperature of the month on the 4th; the others came on the 10th, 15th, 20th, and 25th; they were all predicted in good time by the Signal Office at Washington, and cold-wave flags displayed accordingly at the central office, at Omaha, at Lincoln, and at Stromsburg. At this station the signal was hoisted from fourteen to thirty-four hours before the lowest temperature. No severe storms have occurred in the state.

Weather.—On the whole the weather has been about normal for February, except that the highest temperatures for the month have been higher than usual. The mean temperature for the southeast section has been slightly above the normal, and the precipitation somewhat deficient; in the western part of the state, however, and especially in the central, it has been much warmer than usual.

One hail storm, a very unusual feature for February, is reported from West Hill. Thunder-storms, not usually so rare, have not been reported from any station, although distant lightning was seen by observers at Crete and Weeping Water.

Winds.—The highest wind velocity reported was at the central station, forty-two miles per hour, on the 24th.

Precipitation.—The average rain for the different sections of the state for February, 1886, is as follows: Northeast section (two stations), 0.58 inch; west section (one station), 0.93 inch; south-middle section (two stations), 0.50 inch; southeast section (covering essentially what has heretofore been the "whole state" as far as reporting), 0.70 inch; state average by sections, 0.68 inch.

Wild geese were seen flying north by various observers from the 16th to the 23d, and wild ducks were seen during the last week of the month. Mirage was several times reported at Marquette, and halos were seen by several observers.

The following is an extract from the February, 1886, "Bulletin of the New England Meteorological Society," under direction of Prof. Winslow Upton, Providence, Rhode Island:

Summary for February, 1886.

Reports for the month were received from one hundred and forty observers.

General conditions.—The meteorological conditions of the month may be briefly enumerated in six divisions: First, 1st–8th; generally fair and cold, with the minimum temperatures experienced on the 5th and 6th. On the 4th a severe cyclonic depression moved northeasterly in the Atlantic, causing strong winds and snowfall at stations along the southern and eastern coast. The maximum snowfall, 10 inches, was reported at New Bedford and Nantucket. Second, 9–15th; temperature above the average, increasing cloudiness, culminating in general rains, which were of unusual severity in southern New England on the 11th and 12th. Two depressions moved northeasterly along the westerly limit of the districts on the 13th and 15th, respectively: Third, 16–18th; fair and cold. Fourth, 19th–22d; cloudy, with rain and snow attending three depressions which moved easterly, the first and second across the northern portion on the 19th and 21st, and the third north of the district on the 22d. Fifth, 23d–24th; clear and cold. Sixth, 25–28th; a period of very violent winds, with snow and rain on the 25th and 26th, attending the passage of a cyclonic depression of marked intensity.

Special features.—The following deserve prominent mention:

1. *The heavy rains of the 11th and 13th:* On the 11th the pressure was abnormally high, 30.9 inches in the eastern portion. Copious rains were falling in the west, a barometric trough, 30.0 inches, extending from the Gulf of Mexico to the lakes. A cyclonic depression formed in the Ohio Valley on the 11th and took a definite path on the 12th in Illinois. The pressure fell rapidly and the centre passed along the Saint Lawrence Valley on the 13th. The rainfall was general throughout New England, but in the southeastern portion was unprecedented. In southeastern Connecticut and Rhode Island over eight inches fell, and about two inches must be added to this amount from the melting snow and ice in estimating the quantity of water which poured into the rivers. The resulting damage to property was very great.

2. *The violent winds of the 25–28th:* A depression of great energy moved easterly across New England on the 25th and 26th from the Lake region. The pressure fell to 28.68 at Gardiner, Maine, where the storm was central as it passed. The barometric gradients were very steep, especially after the passage of the centre. On the morning of the 27th the pressure ranged from 28.89, at Yarmouth, Nova Scotia, to 29.95, at Albany, and on the morning of the 28th from 29.26 to 30.10 at the same stations, while it was 30.5 in the upper lake region. High winds necessarily resulted from such differences of pressure. The precipitation was snow turning to rain and then to snow again. The temperature was far below freezing before the storm began, but rose rapidly as it approached and fell with equal rapidity after its passage.

Miscellaneous.—Auroras were reported on the 10th at Burlington and Saint John; 22d at Eastport, Kent's Hill, and Cambridge (suspected); 9th, 17th (suspected), 18th (suspected) at Newburyport; 24th at Bar Harbor.

Thunder and lightning were noted at Bridgeton, evening of the 13th in west; Lunenburg, 14th, 8.30 p. m., and Littleton, 14th, lightning seen in southeast. On the 15th many observers made similar reports, varying in time from 8 p. m. at Blue Hill to 11.45 p. m. at Saint John. At Bar Harbor the heaviest thunder occurred at 9.20 and the storm was severe. On this date a depression was moving northeasterly along the Saint Lawrence Valley, and the above reports are from places situated about one hundred and fifty miles southeast from the centre.

The newspapers report three shocks of earthquake at midnight and at 2.20 a. m. of the 3d instant at Bridgeport, Connecticut, and vicinity.

The verification of the daily weather indications displayed by local flag signals gives a percentage of 89.3 for weather and 89.3 for temperature at New Haven, and 82.0 for weather and 90.0 for temperature at twelve other stations.

The following summary is made from reports furnished by Prof. B. F. Thomas, of the Ohio State University, Columbus, Ohio, director of the "Ohio Meteorological Bureau," in advance of the regular monthly report:

State summary.

Mean temperature, 25°.9; highest temperature, 65°.1, at McConnellsville, on the 11th; lowest temperature, —18°.3, at Wauseon, on the 5th; range of temperature, 83°.4; mean daily range of temperature, 18°.5; greatest daily range, 48°.0, at Ohio State University, on the 17th; least daily range of temperature, 2°.8, at Toledo, on the 7th.

Average monthly precipitation, 1.42 inches; greatest rainfall, 3.25 inches, at New Alexandria; least rainfall, 0.47 inch, at Napoleon.

Average number of days on which rain or snow fell, 9.0; average number of cloudy days, 10.8; average number of fair days, 10.7; average number of clear days, 6.5.

Prevailing direction of the wind, southwest.

The following is an extract from the "Tennessee State Board of Health Bulletin," for February, 1886, prepared under the direction of J. D. Plunkett, M. D., President of the State Board of Health. The summary is prepared by Major H. C. Bate, in charge of the State Meteorological Service:

The month of February presented several abnormal features, the chief of which were the extraordinary depth of snowfall and the low temperature during the early portion of the month, and the high winds which prevailed during the latter portion. Taken altogether it was a very disagreeable month.

The mean temperature was 36°.56, 2°.79 above the mean for the corresponding period last year, and 8°.44 below the mean for February, 1884. The mean of maximum temperatures was 62°.97, respectively 4°.60 and 6°.26 below that for the corresponding periods in 1885 and 1884. The mean of minimum temperatures was 6°.63 below zero, respectively 9°.43 and 14°.13 below that for February, 1885 and 1884. the maximum temperature was 70°, recorded at Lexington, on the 14th, and was 2° below the maximum of February, 1885, and 4° below that of February, 1884. The minimum temperature, 22° below zero, recorded at Austin, on the 5th, was 18° below the minimum recorded in February, 1885, and 16° below that for the same period in 1884. It may be well to observe that this minimum was recorded by a Kendall thermometer and not a standard. The lowest recorded by a standard thermometer was —18°.5, on the 5th, at Riddleton, a station some fifteen miles to the northeast of Austin.

The mean precipitation was 3.80 inches, 1.41 inches greater than that for February, 1885, and 4.65 inches less than that for the corresponding period in 1884. As in the preceeding month the western division received the greatest amount, averaging over five inches, while the middle division received a little over three and a half inches, and the eastern division received only about two and three-fourths inches. The greatest precipitation occurred on the 2d, 3d, 11th, 15th, and 25th, that of the 11th being the greatest. The greatest local daily rainfall occurred at Lexington, on the 11th, and amounted to 3.20 inches. These rains were all general, and with the exception of that of the 25th, were accompanied with snow or snow and sleet. The rain of the 11th was heaviest in the western division. There were only four days reported without rain or snow, viz., 7th, 17th, 21st, and 22d.

The snowfall during the month was unprecedented in the memory of the oldest inhabitant. On the 2d, 3d, and 4th the fall reached a depth in the northern portion of the western division of more than twenty inches, and in the northern portion of the middle division from fifteen to twenty inches. The depth in the eastern division was considerably less. The greatest depth reported was twenty-seven inches, at Trenton. In the southeastern portion of the state the fall was light, being only half an inch at Parksville. According to the reports, snow fell on seventeen days in some portions of the state, as follows: 1st, 2d, 3d, 4th, 5th, 6th, 9th, 11th, 12th, 13th, 15th, 16th, 19th, 20th, 24th, 27th, 28th.

State summary.

Mean temperature, 36°.56; highest temperature, 70°, on the 14th, at Lexington; lowest temperature, 22° below zero, on the 5th, at Austin; range of temperature, 92°; mean monthly range of temperature, 68°.88; greatest monthly range of temperature, 86°, at Austin; least monthly range of temperature, 57°, at Chattanooga and Waynesborough; mean daily range of temperature, 18°.27; greatest daily range of temperature, 49°, on the 5th, at Paris; least daily range of temperature, 1°, on the 2d, at Florence Station, Ashwood, Waynesborough, and Lexington; mean of maximum temperatures, 62°.97; mean of minimum temperatures, —6°.63; mean depth of rainfall (including melted snow), 3.80 inches; mean daily rainfall (including melted snow), 0.136 inch; greatest rainfall, 6.74 inches, at Trenton; least rainfall, 0.79 inch, at Greenville; greatest local daily rainfall, 3.20 inches, on the 11th, at Lexington; days of greatest rainfall (including snow and sleet), 2d, 3d, 11th, 15th, 25th; day of greatest rainfall, 11th.

Average number of days on which rain or snow fell, 8.5; average number of clear days, 11; average number of fair days, 8; average number of cloudy days, 9.

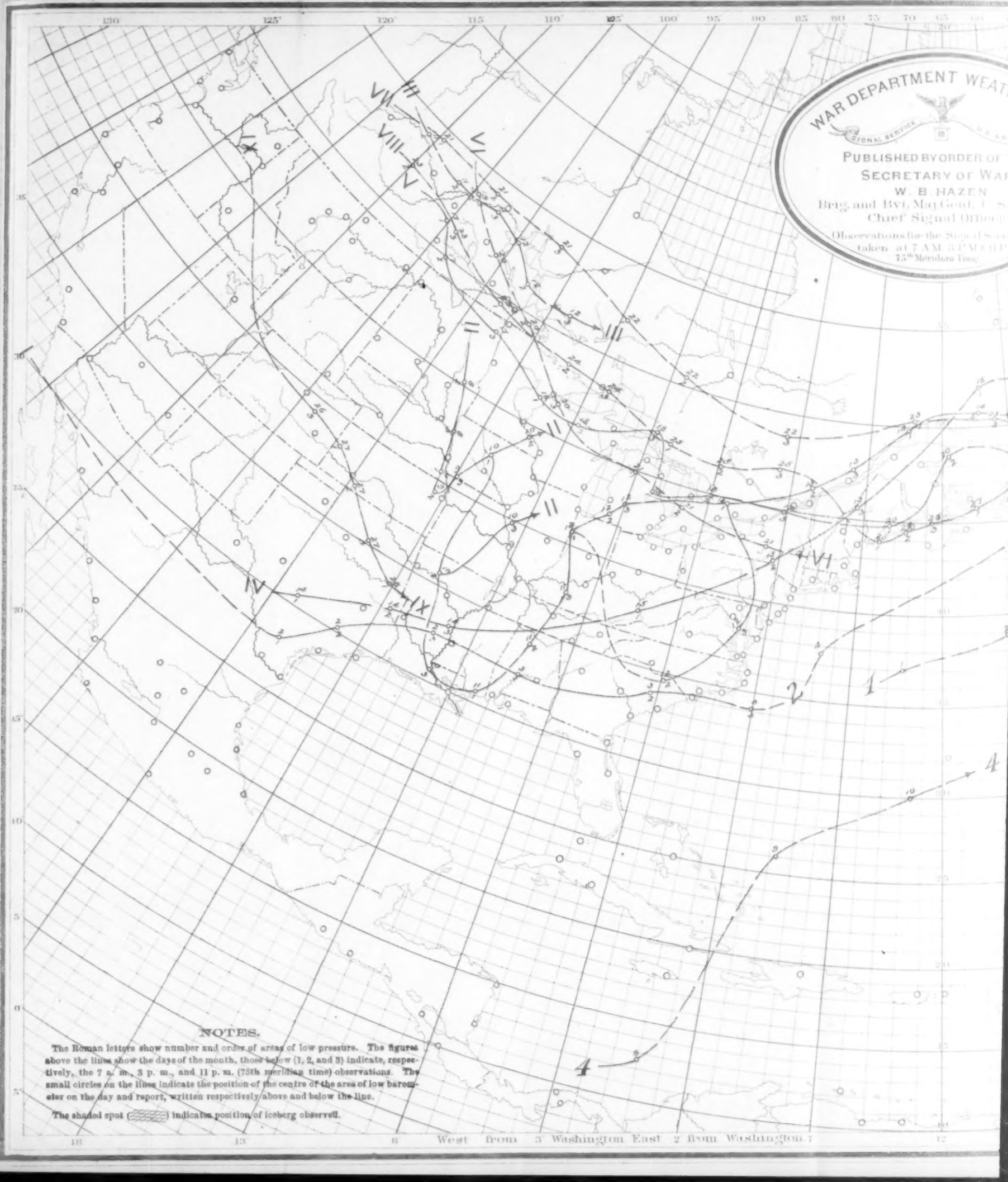
Mean depth of snowfall, 10.28 inches; greatest depth of snowfall, 27.25 inches, at Trenton; least depth of snowfall, 0.50 inch, at Parksville.

Days without rain or snow, 7th, 17th, 21st, 22d; warmest days, 11th, 14th and 23d; coldest days, 4th and 5th.

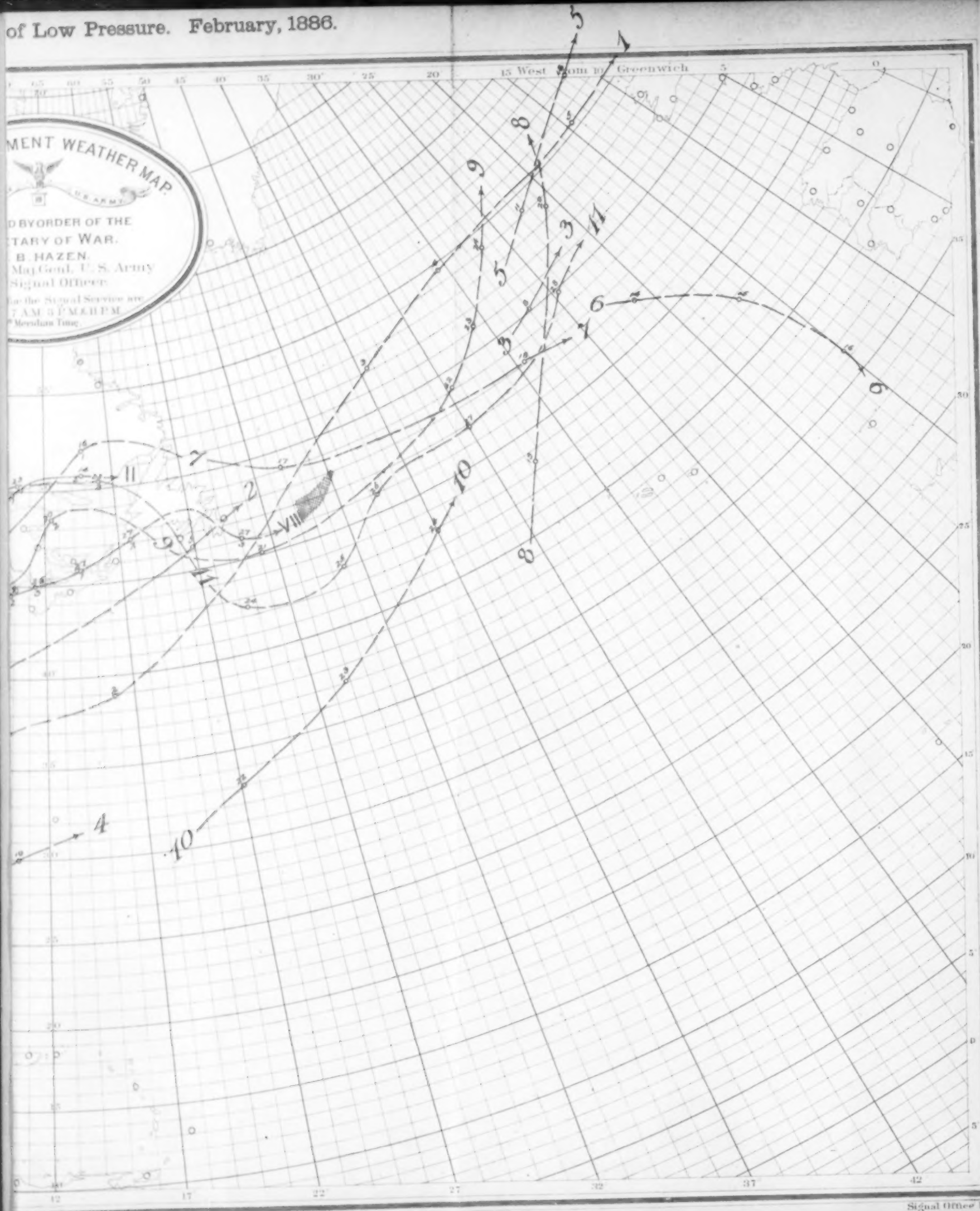
Prevailing winds, west and northwest.

Form 106 C 1884.

Chart I. Tracks of Areas of Low Pres



of Low Pressure. February, 1886.



Signal Office Lith

Chart II. Isobars, Isotherms, and Winds. February, 1886.

Form 106 F.

Form 106 F.

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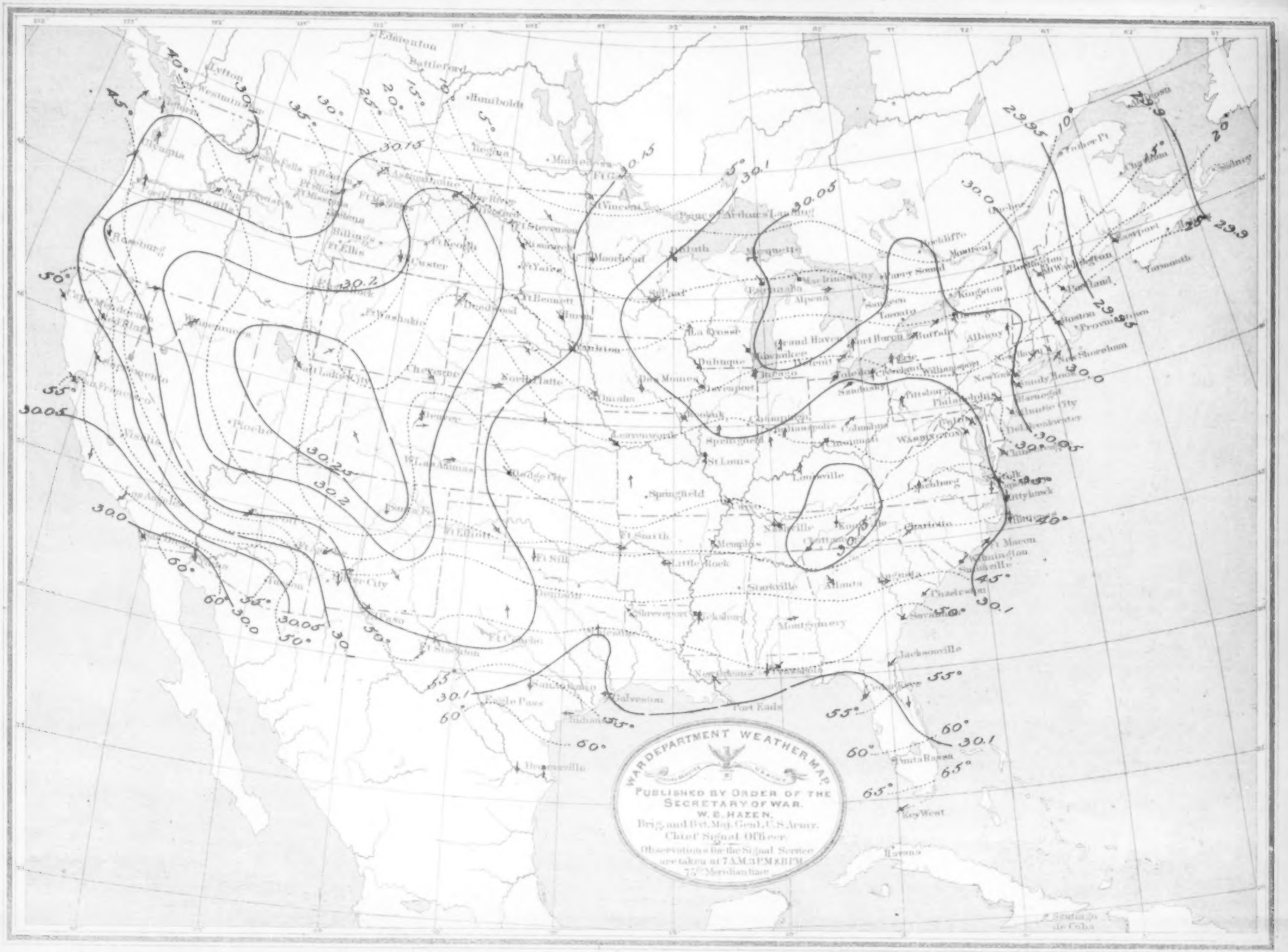
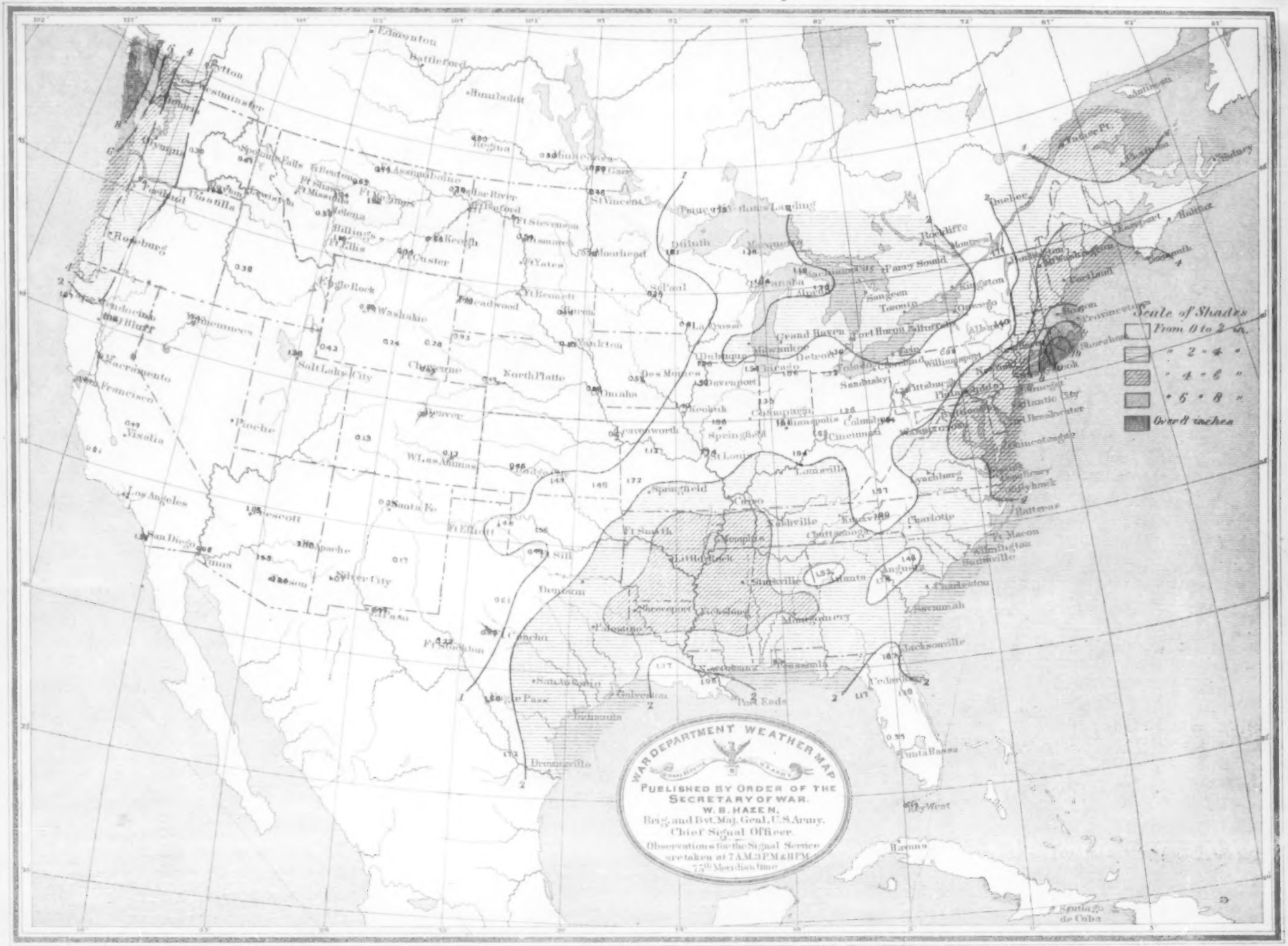

WAR DEPARTMENT WEATHER MAP
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
W. E. HAZEN,
Brig. and Bvt. Maj. Genl. U.S. Army,
Chief Signal Officer.
Observations for the Signal Service are taken at 7 A.M. 3 P.M. & 11 P.M.
75th Meridian time.

Form 106 F.

Chart III. Precipitation, February, 1886.

Form 106 F.

Chart III. Precipitation, February, 1886.


Scale of Shades
From 0 to 2 in.
" 2 " 4 "
" 4 " 6 "
" 6 " 8 "
Over 8 inches
WAR DEPARTMENT WEATHER MAP
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SECRETARY OF WAR.
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75th Meridian time

Signal Office Lith.

Chart IV. Departures from Normal Atmospheric Pressure and Temperature. February, 1886.

Form 106 F

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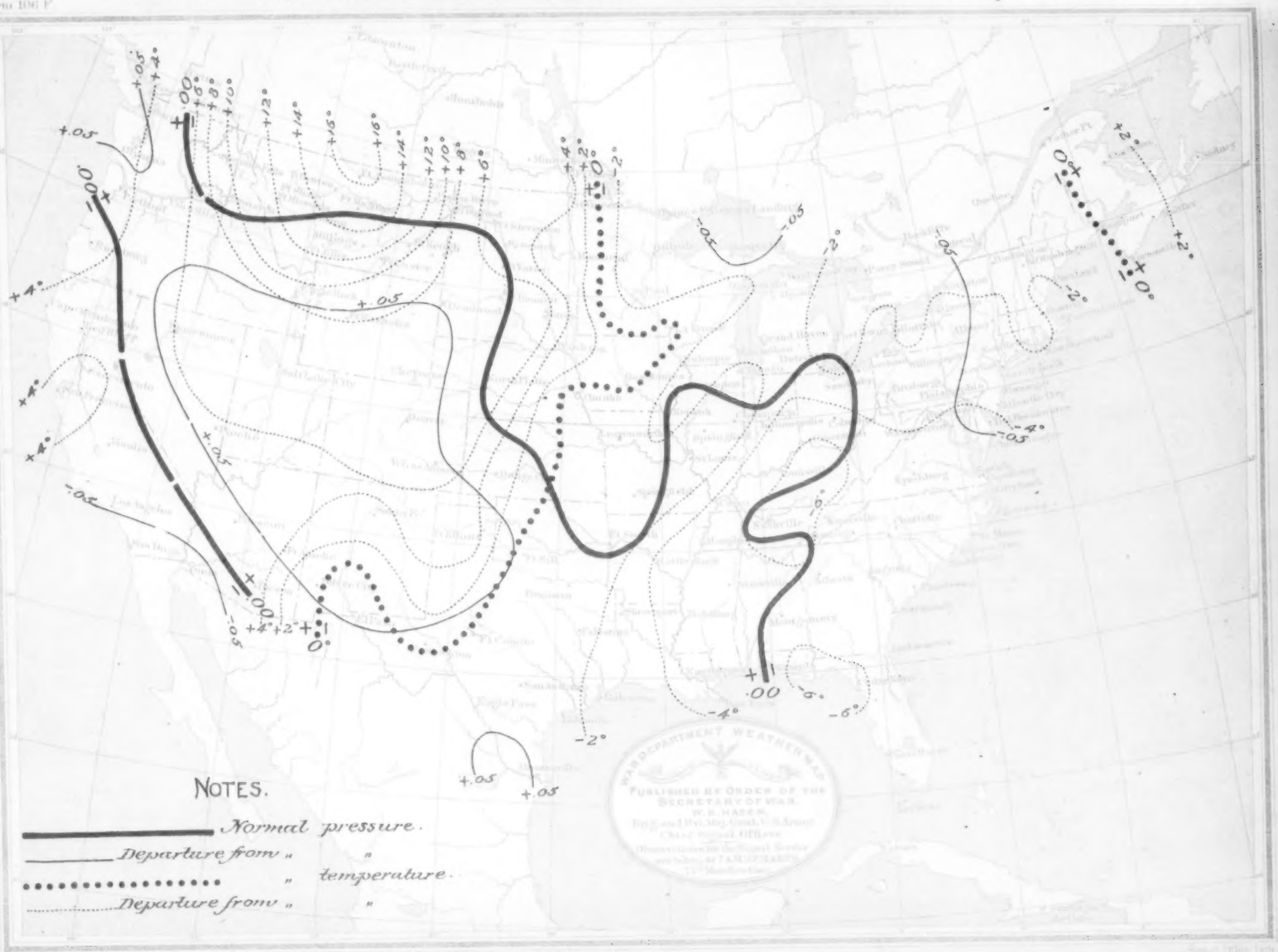
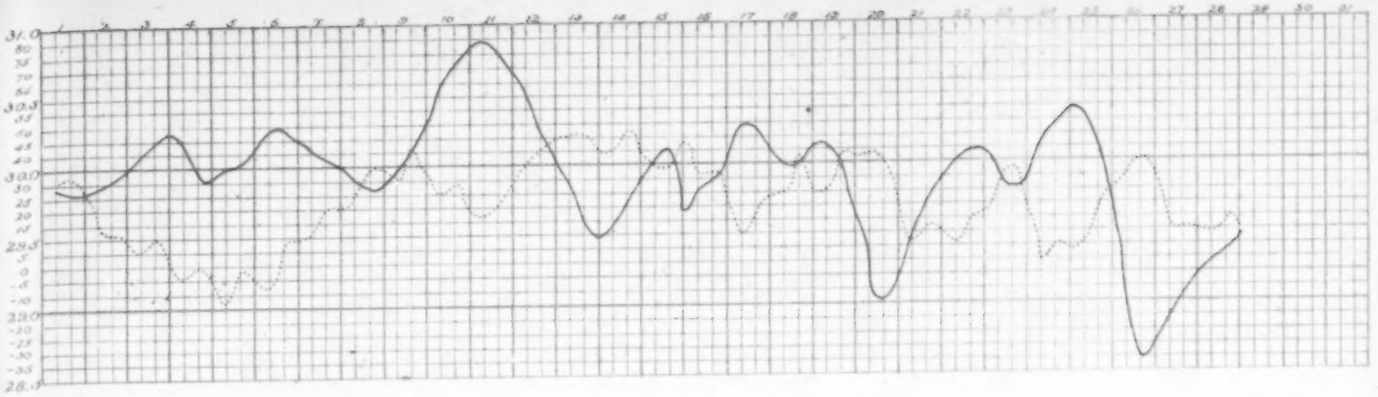
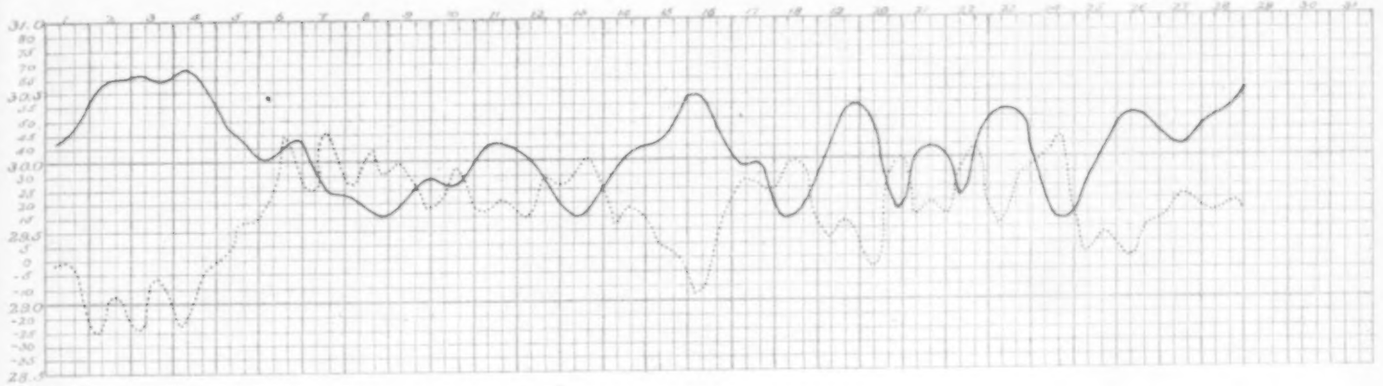


Chart V. Pressure (———) and Temperature (·····) Curves. February, 1886.

EASTPORT, ME.

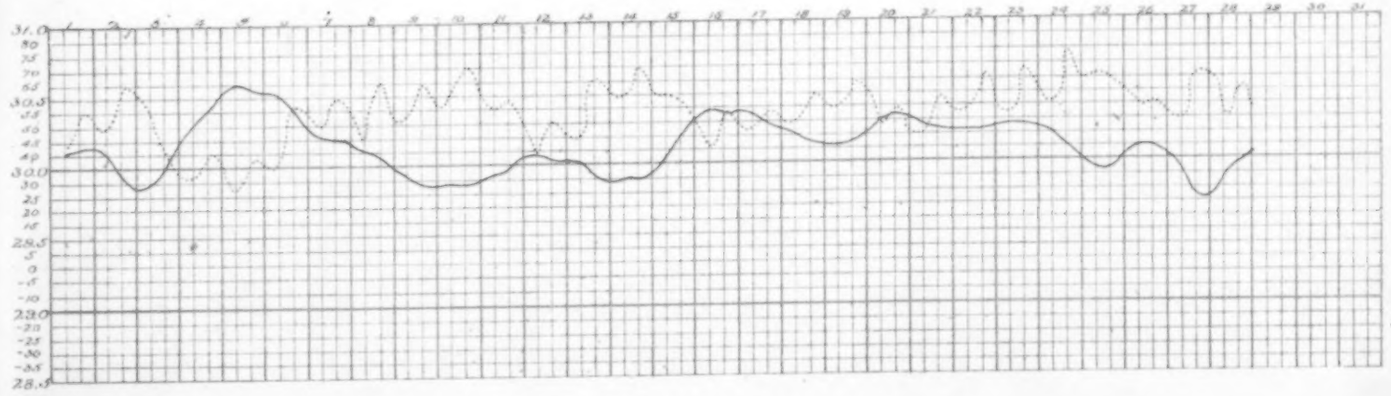


SAINT PAUL, MINN.



PORTLAND, OREG.

NEW ORLEANS, LA.



Voluntary observers of the Signal Service, on land, from whom meteorological reports were received in time to be used in the preparation of the Monthly Weather Review for February, 1886.

Observer and place of observation.
Adams, Effie, Logan, Iowa.
Alexander, S., Birmingham, Mich.
Anderson, Dr. W. W., Statesburg, S. C.
Altaffer, J. M., Independence, Kans.
Adams, Dr. O. H., Vineland, N. J.
Abbott, Dr. E. K., Salinas, Cal.
Arents, Hiram, Oroville, Cal.
Avey, O. H., Oskaloosa, Iowa.
Adams, A. H., Fort Meade, Fla.
Allen, J. H., Penrod, Ky.
Andrews, Luman, Southington, Conn.
Anderson, Prof. J. T., Fayette, Mo.
Blake, J. H., Blue Lake, Cal.
Bentley, David, Princeton, Cal.
Bryant, A. T., Yutan, Nebr.
Bisbee, Capt. Lewis, Buckfield, Me.
Boerner, Prof. Chas. G., Vevay, Ind.
Boynton, John F., Syracuse, N. Y.
Bayerly, J. F., Spartanburg, S. C.
Bennett, Geo., Bandon, Oreg.
Bell, Joseph, Franklin, Pa.
Brainerd, Dr. H. G., Independence, Iowa.
Baker, Dr. Henry B., Lansing, Mich.
Beall, Dr. R. L., Lenoir, N. C.
Brendel, Dr. Fred., Peoria, Ill.
Bartlett, E. B., Vermillion, N. Y.
Baldwin, A. L., Bethel, Conn.
Briggs, John, Albany, Oreg.
Betts, Prof. Arthur, Webster, Dak.
Breed, J. E., Embarras, Wis.
Boyd, Joseph, Oskaloosa, Iowa.
Beebe, A., Manistique, Mich.
Boies, Lieut. A. H., Hudson, Mich.
Beans, T. J., Moorestown, N. J.
Barney, W., Stowe, Vt.
Blachly, C. P., Manhattan, Kans.
Bridges, Q. A., Berlin Mills, N. H.
Beecher, Chas., Wysox, Pa.
Bowman, Peter, Ruggles, Ohio.
Cook, S. A., Milledgeville, Ga.
Calhoun, P. B., Austin, Tenn.
Cowgill, Prof. E. B., Manhattan, Kans.
Cutler, J. L., Quitman, Ga.
Charbonnier, Prof. L. H., Athens, Ga.
Clark, A. C., Wausau, Wis.
Casey, Geo., Auburn, N. Y.
Crawford, E. A., Liberty Hill, La.
Curtiss, G. G., Fallston, Md.
Cornell University, Ithaca, N. Y.
Cutting, Dr. Hiram A., Lunenburg, Vt.
Crosier, Adam, Laconia, Ind.
Caulkins, John S., Thornville, Mich.
Clark, T. A., Weldon, N. C.
Cass, John J., Allison, Kans.
Cleveland, Dr. G. H., Pentwater, Mich.
Carpenter, Dr. W. B., Leavenworth, K.
Christ, Jacob, Franklin, Wis.
Cheney, Wm., Minneapolis, Minn.
Culver, G. E., Vermillion, Dak.
Carter, Rev. Dr. W. H., Tallahassee, Fla.
Comstock, Prof. F. M., Le Roy, N. Y.
Collin, Prof. A., Mount Vernon, Iowa.
Cummings, L. D., Palmyra, N. Y.
Cooper, Dr. Geo. C., Manatee, Fla.
Chubbs, Thos. H., Post Mills, Vt.
Cole, Seward, Cahuenga, Cal.
Cutler, B. B., Heath, Mass.
Chapin, Adams, Poway, Cal.
Childs, W. H., Brattleborough, Vt.
Cochran, Wm. P., Wakefield, Kans.
Colton, Prof. G. H., Hiram, Ohio.
Caffee, Wm. K., Carthage, Mo.
Charlton, Prof. O. C., Ottawa, Kans.
Chandler, Dr. W. J., South Orange, N. J.
Dudley, Charles B., Altoona, Pa.
Dechant, W. H. Mahanoy Plane, Pa.
Dow, Roswell, Sycamore, Ill.
Deming, H. D., Wellsborough, Pa.
Dozier, Wm., Mattoon, Ill.
Dewhurst, Rev. E., Voluntown, Conn.
Day, Theodore, Dyberry, Pa.
Dawson, Wm., Spiceland, Ind.

Observer and place of observation.
Davis, W. O., Bloomington, Ill.
Dunton, Lieut. W. R., Dorset, Vt.
Dinsmore, jr., Prof. T. H., Emporia, Kans.
Ellason, W. A., Statesville, N. C.
Eckstein, Rev. M., Conception, Mo.
Ellis, John, Marquette, Nebr.
Ellsworth, W. W., Hartford, Conn.
Everett, Dr. J. T., Clyde, Ohio.
Ewell, Dr. M. D., South Evanston, Ill.
Elliott, Rev. J. C., Swanwick, Ill.
Fox, F. E. Fall Brook, Cal.
Fox, G. W. Murietta, Cal.
Fouch, Dr. A. Anderson, Cal.
Ford, H. C., El Dorado, Kans.
Ferborg, J. E., Pekin, Ill.
Ferris, B. F., Sunman, Ind.
Fuller, E. N., Tacoma, Wash. T.
Friend, Chas. W., Carson City, Nev.
Fleming, J., Readington, N. J.
Field, Thos. G., Parkersburg, W. Va.
Ferguson, W., Paterson, N. J.
Fernald, Prof. M. C., Orono, Me.
Gore, Prof. J. W., Chapel Hill, N. C.
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Green, Dr. Jesse C., West Chester, Pa.
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Garlick, Rev. Dr. J. R., Bruington, Va.
Gray, Capt. A. W., Kenewick, Wash. T.
Gustin, M., Troy, Pa.
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Hammitt, John W., College Hill, Ohio.
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Howe, Prof. J. L., Richmond, Ky.
Houghton Farm Experiment Station, Mountainville, N. Y.
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Harper, Geo. W., Cincinnati, Ohio.
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Hatch, A. H., Windsor, Ill.
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Hanson, Olof. Kendall Green, D. C.
Hunter, Dr. T. C., Napoleon, Ohio.
Hall, Chas. C., Dudley, Mass.
Housekeeper, H. S., South Bethlehem, Pa.
Jenner, G. W., Sidney, Nebr.
James, John W., Marengo, Ill.
Jones, Dr. E. U., Taunton, Mass.
Jackson Company, Nashua, N. H.
Jordan, Dr. M. D. L., Milan, Tenn.
Jones, Ira B., Neillsville, Wis.
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Knapp, J. G., Limona, Fla.
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Kuhne, F. W., Fort Wayne, Ind.
Keith, J. C., College City, Cal.

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Kedzie, D. H. Midland, Tex.
Kent, Miss E., Phillipsburg, N. J.
Lueps, Miss Anna, Manitowoc, Wis.
Lincoln, A. T., Marion, Va.
Loomis, J. C., Jeffersonville, Ind.
Lay, Dr. F. H., Pueblo, Colo.
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Ladshaw, Geo. E., Pacolet, S. C.
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Williams, Rev. C. F., Ashwood, Tenn.
Wing, Miss M. E., Charlotte, Vt.
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Yetter, Wm. G., Catawissa, Pa.
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Zimmerman, F. C., Bunker Hill, Ill.

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Angel Island, Cal.	Clark, Fort, Tex.	Lyon, Fort, Colo.	Mount Vernon B'ks, Ala.	Ringgold, Fort, Tex.	Supply, Fort, Ind. T.
Assiniboine, Fort, Mont.	Concho, Fort, Tex.	McIntosh, Fort, Tex.	Niagara, Fort, N. Y.	Snelling, Fort, Minn.	Totten, Fort, Dak.
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Bidwell, Fort, Cal.	Fred Steele, Fort, Wyo.	Mason, Fort, Cal.	Plattsburg Barracks, N. Y.	Sisseton, Fort, Dak.	Washakie, Fort, Wyo.
Brady, Fort, Mich.	Gaston, Fort, Cal.	Madison Barracks, N. Y.	Pembina, Fort, Dak.	Shaw, Fort, Mont.	Wingate, Fort, N. Mex.
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State weather services from which meteorological reports were received in time to be used in the preparation of the Monthly Weather Review for February, 1886.

Alabama State Weather Service, under direction of Prof. P. H. Mell, jr., Auburn, Alabama.
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Indiana State Weather Service, under direction of Prof. H. A. Huston, La Fayette, Indiana.
Indiana State Weather Service, under direction of Prof. W. H. Ragan, De Pauw University, Greencastle, Indiana.
Minnesota State Weather Service, under direction of Prof. W. W. Payne, Northfield, Minnesota.
Missouri State Weather Service, under direction of Prof. Francis E. Nipher, Saint Louis, Missouri.
Nebraska Weather Service, under direction of Prof. Goodwin H. Swezey, Crete, Nebraska.
New England Meteorological Society, Prof. Winslow Upton of Providence, R. I., President; Prof. W. M. Davis, of Cambridge, Mass., Secretary.
Ohio State Weather Service, under direction of Prof. B. F. Thomas, of the Ohio State University, Columbus, Ohio.
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